WINTER KITBUILDING FUN—1980

Heathkit®

Brand new kits lead the way into the 1980s — and keep your family company all winter long!

- New Heathkit 4-Element, Tri-Band Yagi Antenna is our easiest-to-assemble ham antenna ever with an industry first — a detailed, step-by-step assembly manual — page 92
- Berlitz Self-Instruction Language Programs in French, German, Italian and Spanish, plus an electronic Language Translator — page 14
- Three new Heathkit Continuing Education Programs — Descriptive and Inferential Statistics — page 13; IC Timers — page 11
- New Heathkit Ultrasonic Cleaner takes care of hard-to-clean items with ease — page 17

HEATHKIT MAIL ORDER CATALOG NO. 848

HANDY INDEX ON BACK COVER

help you save energy and money—both at home and in the car

Authentic Casablanca Fan operates on just pennies a day

The Heathkit Casablanca Fan is the nostalgic, decorative way to keep heating and cooling costs down, and assure your comfort for every season of the year. The Ca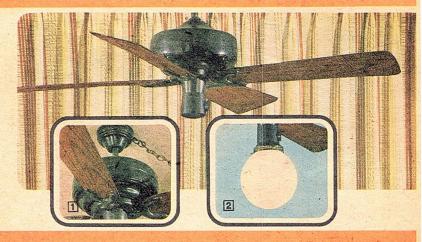sablanca Fan brings heat down from high ceiling areas during heating season. And it provides whisper-quiet cooling in your home for just pennies a day in cooling season. With its fan motor finished in a warm baked-bronze enamel, the GD-1238 features chain-pull or wall switch operation, variable speed adjustment from 145 to 180 revolutions per minute, and 52-inch blades (tip to tip). For an even more charming decorative effect, add the optional lamp or Swag-Chain kits. (Not for ceilings under 8 feet high).

Kit GD-1238, Shpg. wt. 24 lbs. **109.95**

Slow-Speed Accessory. Lowers fan speed to 50-100 rpm. Ideal for smaller rooms, lower ceilings. GDA-1238-3, 1 lb. ..**14.95**

[1] Swag-Chain Kit. Mount your Casablanca fan most anywhere. Includes: 18' antique brass swag chain, gold electrical cord, hardware.
GDA-1238-1, 4 lbs. **14.95**

[2] Light Kit. Adds old world charm and dual purpose to your fan. Includes glassware, glassware holder and mounting accessories.
GDA-1238-2, 3 lbs. **16.95**

Add more lights up to 300 watts

Lamp dimmer saves power, bulbs

A great first-time kit. Adjusts brightness of lamps up to 300 watts, giving your home a decorator touch. Saves energy and extends bulb life. Also makes a great heat control for pencil-type soldering irons.
Kit GD-1018, Shpg. wt. 2 lbs.
7.95

Speed Control increases gas mileage, reduces fatigue on long auto trips
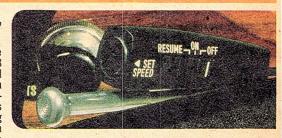
Just accelerate to your desired speed, set the control and relax! The Heath/Dana CS-2048 Speed Control automatically maintains speed uphill or downhill, around curves and on straightaways. A touch of the brake pedal releases the control, while a resume switch lets you slow down or pass cars without affecting the set speed and a set button lets you set a new cruise speed. Fits most domestic cars. Fits foreign cars with adaptor kits sold below. 12 VDC, negative gnd. only.

CS-2048, Shpg. wt. 6 lbs. **79.95**

CSA-2048-1. Magnet pair, adhesive and filament tape, instructions for front-wheel-drive cars not covered in kits below or for parts replacement. 1 lb. ..**5.95**

CSA-2048-2. Servo cable, throttle linkage adaptor hardware and magnet pair for '73-'75 Honda Civic 1200 CC, '75-'78 Honda CVCC, '77-'78 Honda Accord. 2 lbs. **14.95**

CSA-2048-3. Servo cable, throttle linkage adaptor hardware, vacuum tee for '75-'78 Toy. Corolla 1600 CC. 2 lbs. **14.95**

CSA-2048-4. Throttle linkage adaptor hardware, vacuum tee for '73-'78 Toy. Corona, '73-'78 Toy. Celica,

'74-'75 Toy. Crown, '75-'76 Toy. Mark II, '76-'78 Toy. pickup, '74-'78 Dat. 610/710, '77-'78 Dat. 810, '74-'78 Dat. 280Z. 1 lb. **4.95**

CSA-2048-5. Servo cable, magnet pair, throttle linkage adaptor hdwe., vacuum tee, engagement switch mounting post for these fuel-injected cars: '76-'78 Volks. Dasher, Scirocco and Audi Fox; '77-'78 Volks. Rabbit. 2 lbs. **14.95**

CSA-2048-6. Servo cable, magnet pair and throttle linkage adaptor hdwe. for '75-'78 Dat. B210, '77-'78 Dat. F10. Shpg. wt. 2 lbs. **14.95**

IMPORTANT NOTE: Installation requires some mechanical knowledge and proficiency. If you are uncertain of your abilities, you may wish to consult a qualified auto mechanic.

Save gas with Capacitive-Discharge Ignition

Improves gas mileage, helps you get longer life from plugs and points

Get up to 50,000 miles between tune-ups on cars, trucks, inboards, I/O and outboard marine engines with 12V battery/distributor/coil negative ground systems. Delivers a larger, more precisely-controlled spark to better burn the fuel mixture. Reduces problems caused by point bounce and wear. Dimensions, 3⅛" H x 3¾" W x 6" D.
Kit CP-1060, Shpg. wt. 3 lbs. **39.95**

Versatile Heathkit Ignition Analyzer makes engine tune-ups easier

Detects shorted spark plugs, bad ignition points, defective wiring, worn distributor parts, incorrect dwell angle, plus coil or condenser defects and transistor or capacitive discharge circuitry problems. Can be used with any standard, transistorized or capacitive discharge ignition system, with 4, 6 or 8-cylinder engines with distributors. Select one of four different display patterns. For detailed analysis, both horizontal and vertical sweeps can be expanded. Kit includes adapter for use with General Motors High Energy Ignition systems.
Kit CO-1015, Shpg. wt. 22 lbs. **169.95**
Kit COA-1015-1, 12-Volt Inverter. Operate CO-1015 from 12V cig. lighter socket. 3 lbs. **34.95**

3

Broaden your horizons with Heathkit Continuing Education

Take the toil out of learning with Heathkit Continuing Education Self-Instruction Programs. Each subject is presented in bite-sized bits to help you learn with ease and enjoyment. Learning is reinforced through the multi-media approach described on this page. But in addition to programmed learning, audio/visual treatments and hands-on experiments, Heathkit Continuing Education goes one step further to assure you success. A technical consultant is just a phone call away to answer any question about the Self-Instruction Program you have chosen. That attention to detail and concern for the student are why thousands of our programs are in use — by individuals, in schools, in business and industry training programs — combining the proven techniques described below to help you succeed.

Programmed learning texts make Heathkit Continuing Education Programs more effective. You can read at your own pace in easy-to-understand, step-by-step segments. No facet of the material is omitted and nothing is assumed. Self-test reviews throughout the text let you check your progress. The text material is accompanied by large, illustrated visual materials that help make the text material more interesting — and more effective. And audio aids are available with some of our programs to make learning even easier. All you need to use the audio aids is a record player or a standard audio cassette recorder/player. Besides the Programs in this section, see our Automotive Program on page 49, Ham Radio on pages 88-89, and Computer related Programs on pages 73 and 85.

Hands-on experience gives you a better understanding of the subject. Learning the subject matter and being able to apply what you've learned are the goals of Heathkit Continuing Education. We spare no effort to help you learn. You learn best by doing, and optional experiments in our programs help you get a better grasp of circuit concepts and other text material. Our optional Electronic Trainers, designed for use with our series of electronics programs, give you actual hands-on experience with electronic components and circuitry. Using the Optional Trainers, you can perform the optional projects in each program more easily. And after you complete the programs, the Trainers serve as ideal circuit experimental units, so you can do your own breadboarding and circuit design work.

Recognition of achievement and the Heathkit Guarantee. If you elect to take the optional final exam and score 70% or better, we recognize your achievement with a Certificate of Achievement and Continuing Education Units (CEUs). CEUs are a nationally-recognized way of acknowledging participation in non-credit adult education. Some of our programs are designed to prepare you for examinations given by professional associations which recognize and certify achievement, and for CLEP examinations, where you can earn college credit for what you learn outside the classroom. If, for any reason, you are dissatisfied with these programs, we will refund the full purchase price of the text material (less trainer).

You can learn with confidence. Heathkit Continuing Education is accredited by the National Home Study Council (NHSC), a government-approved accrediting agency dedicated to maintaining high quality in adult continuing education. And Heathkit Continuing Education is licensed as a school by the State of Michigan. These accreditations are your assurance that the Heathkit Self-Instruction Programs you select are quality Programs designed to give you full value.

IMPORTANT TAX NOTE: All the Continuing Education Programs and trainers may qualify you for a Federal Tax Deduction. Treasury Regulation 162-5 permits an income tax deduction for educational expenses undertaken to: (1) maintain or improve skills required in one's employment or other trade or business, or (2) meet express requirements of an employer or a law imposed as a condition to retention of employment, job status or rate of compensation.

Professionally-designed Basic Electronics programs make learning fast, easy and very affordable

Learning electronics could be the most important step you'll ever take. You can open up new opportunities for yourself. You can perform your own tests and repairs.

There are many factors to consider. If you're like most people, you don't have the time or money to attend a conventional learning institution. It costs a lot in time, travel and tuition.

The Heathkit Basic Electronics Education Programs make learning electronics more convenient and affordable for everyone. Each learning program is simply and logically arranged for easy, step-by-step learning. Each program includes everything you need for thorough understanding.

The AC and DC Electronics Programs are designed for beginners. They're ideal for training field service personnel, maintenance and production technicians in the basics of electronic equipment. They can provide fundamental information for others involved with electronics, too. For example, a chemical engineer who wants a basic background in the electronic systems used in chemical processing can find these programs very useful in providing the necessary knowledge in an organized approach.

The Semiconductor Devices Program is designed for the engineer or technician who is already familiar with basic electronics. It gives you the opportunity to refresh your knowledge of semiconductors and solid-state electronics, and to learn the newest electronic technologies, including integrated circuits and optoelectronics.

The Electronic Circuits Program is ideally suited for design engineers or technicians who wish to learn the easiest or most efficient way to design actual circuits, using the latest developments in electronic components and the newest electronic technologies. You should successfully complete the first three programs in this series — or have equivalent knowledge — before starting this program.

We're so confident you'll be pleased with the Basic Electronics Education Programs, that we offer a money-back guarantee. If, for any reason, you are dissatisfied, we will refund the full purchase price of the text material (less trainer) when you return it.

Get a thorough understanding of basic electronics

DC Electronics Learning Program

Covers current, voltage, resistance, magnetism, Ohm's Law, electrical measurements, DC circuits, inductance and capacitance. In short, a complete foundation in basic electronics. Included are texts, records, and electronic components for 20 different experiments. Cassette tapes that duplicate the material on the records are optionally available. The average completion time for DC Electronics is 30 hours. A knowledge of high school math is assumed and an appropriate review of such material is included. When you have successfully completed DC Electronics, you will be able to accomplish the following:

1. Solve problems of current, voltage, resistance, and power.
2. Explain current, voltage, resistance, and power.
3. Discuss the relationship between electricity and magnetism.
4. Using a schematic diagram as a guide, construct DC circuits with resistors, relays, switches, lamps, batteries, and capacitors.
5. Given a wiring diagram of a circuit, draw an equivalent schematic.
6. Use a multimeter to measure current, voltage and resistance.
7. Convert metric prefixes and work with powers of ten.
8. Explain the construction, operation, and purpose of resistors, potentiometers, switches, fuses, relays, capacitors and inductors.
9. Use safety procedures for you and your test equipment.
10. Build and experiment with basic DC circuits of your own design.

EE-3101, Shpg. wt. 7 lbs. 44.95
Spanish Language DC Electronics Learning Program.
(Less EB-6101-30 Parts for optional experiments. See page 15).
EE-3101-S, Shpg. wt. 7 lbs. 49.95
EEA-3101, Optional Cassettes*, Shpg. wt. 1 lb. 9.95
ECP-3801A, Cassette Record/Player, (not shown, see p. 12).
Shpg. wt. 4 lbs. 60.00

AC Electronics Learning Program

Covers the fundamentals and basic theory of alternating current in a simple, straight-forward manner that can be easily understood. Included is everything you need for thorough, no-compromise learning. Included are texts, records and 16 electronic components for 8 different experiments. If you choose to take the optional final exam and score 70% or better, you will receive a Certificate of Achievement and 1.5 Continuing Education Units. Upon completion of AC Electronics, you will be able to:

1. Explain the difference between AC and DC.
2. Describe the operation of a simple AC generator.
3. Determine average value of an AC sine wave.
4. Determine the frequency of an AC waveform if its period is known.
5. Use AC meters to measure current, voltage, and power.
6. Analyze simple AC circuits which contain resistance.
7. Describe the electrical property of capacitance.
8. Analyze AC circuits with capacitance or capacitance/resistance.
9. Describe the electrical property of inductance.
10. Analyze AC circuits with inductance or inductance and resistance.
11. Determine the current, voltage, and power relationships at the inputs and outputs of both ideal and practical transformer circuits.

EE-3102, Shpg. wt. 7 lbs. 44.95
Spanish Language DC Electronics Learning Program.
(Less EB-6103-30 Parts for optional experiments. See page 15).
EE-3102-S, Shpg. wt. 7 lbs. 49.95
EEA-3102, Optional Cassettes*, Shpg. wt. 1 lb. 9.95
ECP-3801A, Cassette Recorder/Player, (not shown, see p. 12).
Shpg. wt. 4 lbs. 60.00

Semiconductor Devices Learning Program

No education in electronics would be complete without including solid-state technology. Semiconductor Devices teaches you all about this comparatively-recent development. Audio aids help emphasize the text material and you get hands-on experience with the interesting experiments. An optional final exam tests comprehension. Covers fundamentals, diodes, zeners, bi-polar transistor operation and characteristics, FET's thyristors, IC's and opto-electronics. Included are texts, records and 27 electronic components for 11 different experiments. You should first complete the first two Heathkit Continuing Education Programs (DC and AC Electronics) or have equivalent knowledge. If you choose to take the optional final exam and score a passing grade of 70% or better, you will receive a Certificate of Achievement and 3.0 Continuing Education Units. Upon completion of the Semiconductor Program, you will be able to:

1. Describe the electrical characteristics of semiconductors.
2. Name the advantages of semiconductor devices over tubes.
3. Explain how the most important semiconductor devices operate.
4. Describe how semiconductor devices are constructed.
5. Use semiconductor components properly without damage.
6. Recognize semiconductor packages and their schematic symbols.
7. Design your own circuits using semiconductor devices.
8. Test various semiconductor devices for proper operation.

EE-3103, Shpg. wt. 6 lbs. 44.95
Spanish Language Semiconductor Devices Program.
(Less EB-6102-30 Parts for optional experiments. See page 15).
EE-3103-S, Shpg. wt. 6 lbs. 49.95
EEA-3103, Optional Cassettes*, Shpg. wt. 1 lb. 9.95
ECP-3801A, Cassette Recorder/Player, (not shown, see p. 12).
Shpg. wt. 4 lbs. 60.00

Electronic Circuits Learning Program

This program brings all the theory of your first programs together and shows you how it applies in actual circuit operation. You should first complete AC and DC Electronics and Semiconductor Devices (or have equivalent knowledge). Included are texts, records, and 110 electronic components for 18 different experiments. This course requires an oscilloscope like the Heathkit IO-4105 (page 70) to perform the optional experiments. If you choose to take the optional final exam and score 70% or better, you will receive a Certificate of Achievement and 4.0 Continuing Education Units. When you have completed this course, you will be able to:

1. Identify basic amplifier circuits and describe their operation.
2. Discuss direct current amplifiers, audio amplifiers, video amplifiers, intermediate frequency amplifiers, and RF amplifiers.
3. Explain differential amplifiers, comparators, filters.
4. Analyze and design simple inverting and non-inverting amplifiers.
5. Explain power supply rectifiers, filters, and regulation circuits.
6. Identify commonly used LC, RC, and crystal oscillators.
7. Explain shapers, multivibrators, Schmitt triggers, generators.
8. Explain AM, FM, heterodynes, modulation and detection.
9. Construct many transistor and IC circuits.
10. Use voltmeter and oscilloscope to analyze electronic circuits.

EE-3104, Shpg. wt. 7 lbs. 54.95
EEA-3104, Optional Cassettes*, Shpg. wt. 1 lb. 9.95
ECP-3801A, Cassette Recorder/Player, (not shown, see p. 12).
Shpg. wt. 4 lbs. 60.00

These programs use the optional ET-3100 Electronic Trainer for completion of the experiments. See page 6 for description.

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*Optional cassettes duplicate material on records, but in convenient, easy-to-use cassette form.

Learn how to get the most from your test equipment

Heathkit Test Instrument Self-Instruction Program

Would you like to save on repair costs by maintaining your own electronic equipment? This program will help you understand the test equipment you'll need to use. The complete program consists of four units, with all the necessary parts and text materials. The Basic Electronics Program (EE-3101 through EE-3104, see page 5) and the Digital Techniques Program (EE-3201, see page 7) — or equivalent knowledge — are necessary to benefit fully from this program. By completing the optional final exam with a 70% or better score, you'll earn 6.0 CEUs and a Certificate of Achievement.

Unit 1: Analog and Digital Meters

This first learning unit consists of two comprehensive texts, the first describing analog meters and the other, digital meters. The unit on analog meters covers the types of movements and how each is used to measure voltage, current and resistance, the operation of the volt-ohm-milliammeter (VOM) and the electronic volt-ohm-milliammeter. The unit on digital meters covers the conversion from analog to digital, compares analog meters to digital meters and discusses factors to consider when you select your own meter. When you complete both of these texts, you will be able to use both analog and digital meters to make electrical measurements, explain how to determine the sensitivity of a meter, explain how high input impedance is achieved in an electronic meter, describe the uses of the high and low-voltage ohms positions of an ohmmeter. You will be able to explain the advantages of a digital meter over an analog meter, give the reasons to select an integrating digital meter over a non-integrating digital meter, describe how electrical current and resistance are measured with a digital multimeter, explain what is meant by resolution, sensitivity and accuracy, and understand the types of probes used with meters, explaining what each type of probe does. A digital meter, an analog meter and the ET-3100 Trainer (below) should be used to get the most out of Unit 1. Once you've learned about analog and digital meters, you progress to:

Unit 2: Oscilloscopes

The second unit covers oscilloscopes which are essential for designing, testing and servicing electronic equipment. There are an almost infinite number of wave-shapes that can exist with electrical signals, and you can actually see and interpret these wave-shapes with an oscilloscope. Unit 2 discusses the components and circuits which become part of the oscilloscope. It also discusses the function and operation of various controls and how to interpret various scope displays. When you complete this unit, you'll be able to identify the various parts of a Cathode Ray Tube (CRT), identify various oscilloscope controls, explain the uses of each control, identify and describe various types of sweeps, discuss scope specifications, explain the operation and applications of storage and sampling oscilloscopes and identify various oscilloscope controls, explaining the use of each control. An oscilloscope and the ET-3100 Trainer are useful in completing the optional experiments.

Unit 3: Frequency Generation and Measurements

This unit covers frequency generation, measurement and counting. A knowledge of frequency characteristics is essential for performing virtually any electronic circuit troubleshooting and repair. When you complete Unit 3, you'll be able to express frequency values in wavelength, powers of ten and Hertz (Hz), calculate unknown frequency values, select a counter that fits your requirements, understand advantages of electronic counters and potential sources of counter error, list five sections of a general-purpose frequency counter, understand the basic modes of counter operation, increase the frequency range of electronic counters and describe the methods of calibrating electronic counters. Frequency generators, a frequency counter and the ET-3100 Trainer are desirable options.

Unit 4: Special Measuring Instruments
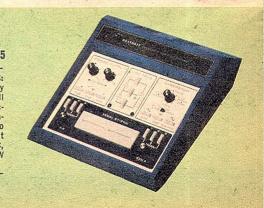
This unit covers some of the more specialized test instrumentation available for making measurements on solid-state devices, digital circuitry and other electronic equipment. You'll learn what these special measuring devices can read, and some basic techniques for using and interpreting these measurements. An oscilloscope, a meter and the ET-3100 are useful for the optional experiments. Take the optional final exam, and you have completed the Heathkit Test Instrument Self-Instruction Program. When you pass the final exam, you will earn 6.0 Continuing Education Units (CEUs).

EE-3105, Shpg. wt. 3 lbs. 59.95

NOTE: Various test instruments are desirable if you wish to complete the optional experiments. See pages 56-70 for our quality test equipment.

Experimenter/Trainer provides hands-on learning experience during experiments

For use with the DC, AC, Semiconductor, Electronic Circuits and Instruments programs — helps you perform each experiment quickly and easily. Has solderless breadboarding sockets, 2-range variable sine and square wave (200-20,000 Hz) signal source, dual-variable power supplies for positive and negative voltages (1.2 to 16 volts, 120 mA), 1k and 100k linear potentiometers. Center tapped transformer provides 30 V rms, 60 Hz for line experiments.

Kit ET-3100, Shpg. wt. 6 lbs. 69.95
ET-3100-S, ET-3100 with Spanish manual.
Shpg. wt. 5 lbs. 79.95

ETW-3100, Factory Assembled Trainer,
Shpg. wt. 6 lbs. .129.95

ET-3100/ETW-3100 SPECIFICATIONS: POWER SUPPLIES: Positive Supply Output: 1.2 to 15 volt DC, continuously variable. Lead Regulation: Better than 1%, no load to full load. Current Output: 100 mA with short circuit protection. Negative Supply Output: -1.2 to -15 volts DC, continuously variable. Load Regulation: Better than 1%, no load to full load. Current Output: 100 mA with short circuit protection. GENERAL: Power Requirement: 120/240 VAC, 60/50 Hz, 7 watts maximum. Dimensions: 3½" H x 12⅛" W x 11¾" D.

Advanced Digital Techniques Self-Instruction Program

Learn the operation of digital logic circuits and the major applications of digital techniques in electronics. Advanced Digital Techniques covers everything from TTL and CMOS to ROM's, PLA, microprocessors and computers.

When you have successfully completed the Digital Techniques Program, you will be able to:

1. Understand the advantages and benefits of using digital techniques in electronic equipment.
2. Name the major applications of digital techniques in electronics.
3. Convert between the binary and decimal number systems and recognize the most commonly used binary codes.
4. Name the major components used in implementing digital circuits and explain how they operate.
5. Understand the operation of digital logic gates.
6. Identify the more commonly used integrated circuit families used in digital equipment and discuss their operation, characteristics, and features.
7. Use Boolean Algebra to express logic operations and minimize logic circuits in design.
8. Understand the operation of flip-flops.
9. Understand the operation and application of binary and BCD counters, shift registers and other sequential logic circuits.
10. Name the most frequently used combinational logic circuits and explain their operation.
11. Design both combinational and sequential logic circuits for a given application from definition and concept to the selection of the integrated circuits.
12. Understand the operation and application of digital counters in time and frequency measurements.
13. Understand how a digital computer is organized and how it operates.
14. Understand microprocessors, explain their operation and give examples of their applications.
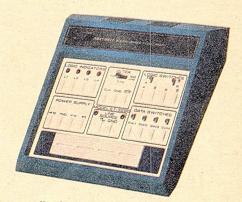
EE-3201, Shpg. wt. 9 lbs. **59.95**
EEA-3201, Optional **Cassettes***, Shpg. wt. 1 lb. **9.95**
ECP-3801A, Fully assembled **Cassette Recorder/Player**, (not shown, see p. 12) Shpg. wt. 4 lbs. **60.00**
*Optional cassettes duplicate material on records.

Teaches fundamentals, logic circuits, design applications, more

The Digital Techniques program covers fundamentals and theory, digital logic circuits, digital integrated circuits, Boolean algebra, flip-flops and registers, sequential logic circuits, combinational logic circuitry and digital design. It shows you how to design digital circuitry for virtually any modern electronic application. The program assumes a prior knowledge of electronics, (either the four basic Heathkit programs or equivalent). Includes text, records and 44 electronic components for 24 experiments. We also recommend the IM-5284 multimeter (page 57) and an oscilloscope such as the IO-4105 (page 70), is desirable for some experiments. If you choose to take the final exam, a passing grade of 70% or better earns you 4.0 Continuing Education Units and a Certificate of Achievement.

This versatile electronic trainer lets you learn by doing. Use it to get maximum benefit from the Digital Techniques Program.

The Heathkit Electronic Trainer is the way to learn by doing. Use it to perform all the experiments in the Digital Techniques Program, develop projects, build and test prototypes, verify circuit operation and check digital IC's. Has solderless breadboard sockets for experimentation and design, four binary data switches, 2 "no-bounce" switches to pulse logic circuits, 3-frequency pulse clock generator and 4 LED's for visual indication of logic states. The ET-3200 also contains three regulated power supplies with outputs of +12 VDC @ 100 mA, — 12 VDC @ 100 mA and +5 VDC @ 500 mA. Each output features current limiting and is overload protected for safe operation. Breadboard sockets accommodate up to eight 14 or 16-pin dual-in-line ICs, also 24, 28, and 40-pin DIPs. The power supplies and circuitry of the ET-3200 are compatible with most of today's commonly-used integrated circuit logic families including: RTL; DTL; TTL; CMOS; ECL; NMOS; PMOS; Linear. For 120/240 VAC, 60/50 Hz.
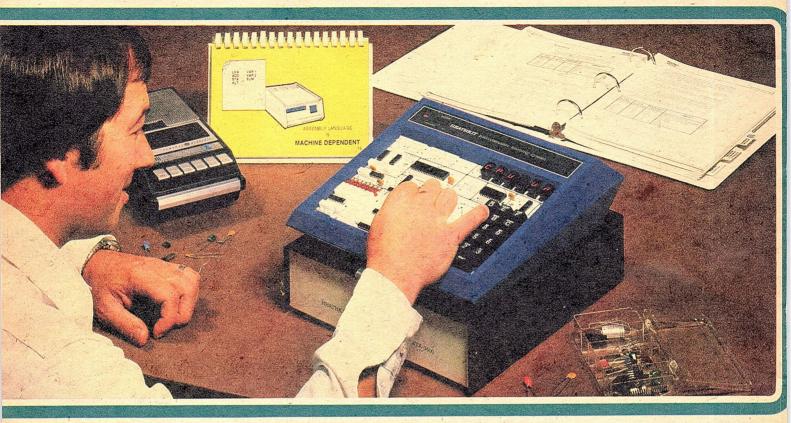
Kit ET-3200, Shpg. wt. 5 lbs. **84.95**
ETW-3200, Assembled and tested version of above, Shpg. wt. 6 lbs. **149.95**

ET-3200 SPECIFICATIONS: DATA SWITCHES: States: +5 volts or 0 volts. **Maximum Current:** 10 mA, each switch. **Outputs:** 4 terminals, one for each switch. **LOGIC SWITCHES: Type:** Momentary contact, spring loaded. **Circuit:** Two flip-flop latches for contact bounce buffering. **Output States:** Complementary, +5 volts and +0.2 volts. **CLOCK: Output Frequency:** 1 Hz, 1 kHz, 100 kHz; ±20%. **Duty Cycle:** 45%. **Output Voltage:** 5 volts peak-to-peak. **POWER REQUIREMENT:** 120/240 VAC, 60/50 Hz, 15 watts maximum. **Fuse:** ³⁄₁₆-ampere, slow-blow. **DIMENSIONS:** 3½" H x 12⅛" W x 11¾" D.

Use for the experiments in the program, and for circuit design and experimentation after you complete it.

You learn about microprocessors, microcomputers and programming in a complete, efficient and well-organized way with the Heathkit Microprocessor Self-Instruction Program. You'll learn microprocessor basics, computer arithmetic, programming, interfacing, perform experiments and much more. Our multi-media approach will help you learn fast.

Winner International Award of Distinction Society of Technical Communicators

As the world enters the computer age, you need new knowledge. Our award-winning Microprocessor Self-Instruction Program uses such proven Heathkit self-instructional techniques as programmed instructions and audio-visual aids to teach computer programming, microprocessor operation, interfacing and related topics. The microprocessor program is organized into 10 learning units as follows:

UNIT 1: NUMBER SYSTEMS AND CODES. Covers decimal, binary, octal, hexadecimal number systems; conversions and binary codes, positional notation.

UNIT 2: MICROCOMPUTER BASICS. Covers terms and conventions, computer words, executing a program, addressing.

UNIT 3: COMPUTER ARITHMETIC: Covers Binary addition, subtraction, multiplication and division; two's complement arithmetic; Boolean operations — AND, OR, Exclusive-OR, INVERT.

UNIT 4: INTRODUCTION TO PROGRAMMING: Covers branching, conditional branching, algorithms, additional instructions.

UNIT 5: THE 6800 MICROPROCESSOR — PART 1. Covers architecture, instruction set and addressing modes.

UNIT 6: THE 6800 MICROPROCESSOR — PART 2. Covers stack operations, subroutines, input-output (I/O) operations and interrupts.

UNIT 7: INTERFACING — PART 1. Covers interfacing fundamentals; interfacing with random access memory (RAM); interfacing with displays.

UNIT 8: INTERFACING — PART 2. Covers interfacing with switches; the Peripheral Interface Adapter (PIA); Using the PIA.

UNIT 9: PROGRAMMING EXPERIMENTS. Covers experiments with binary/decimal, hexadecimal/decimal, and straight line programs; arithmetic and logic instructions, branches, additional instructions, new addressing modes, arithmetic operations, stack operations and subroutines.

UNIT 10: INTERFACING EXPERIMENTS. Covers memory circuits, clock, address decoding, data output, data input, peripheral interface adapter, key matrix and parallel-to-serial conversion, digital-to-analog and analog-to-digital conversion.

NOTE: Units 1 through 6 and Unit 9 assume no prior knowledge of electronics. Units 7, 8 and 10 assume a knowledge of electronics equivalent to the Heathkit Digital Techniques Program.

The EE-3401 is complete with 62 electronic components required to complete the experiments. These components include two 2112 256x4-bit RAM's, 6820 PIA interface chip, 1406 digital to analog converter, 741 and 301 op amps and a variety of other microprocessor-oriented devices. The optional ET-3400 Trainer (page 9) is desirable for experiments.

If you choose to take the optional final exam, a passing grade of 70% or better earns you 8.0 CEU's and a Certificate of Achievement.

EE-3401, Shpg. wt. 12 lbs. 89.95
EE-3401-1 Slides. Optional 35 mm Slides duplicate the audio-visual flip charts in the EE-3401 program. Shpg. wt. 2 lbs. 60.00
EE-3401-2 Filmstrip. Optional 35 mm Filmstrip. 1 lb. 20.00
See page 15 for classroom version of EE-3401.
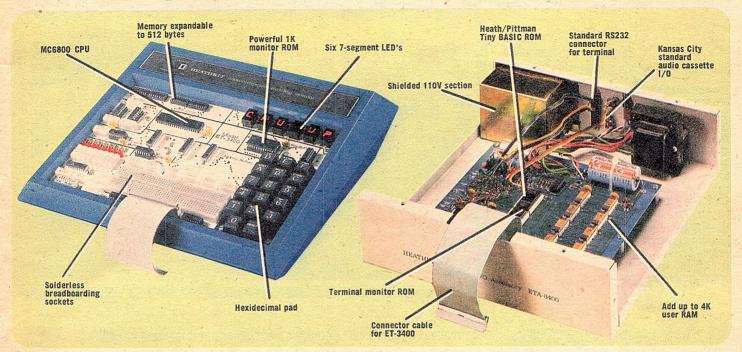
with our Microprocessor Self-Instruction Program and Trainer

Memory expandable to 512 bytes

MC6800 CPU

Powerful 1K monitor ROM

Six 7-segment LED's

Heath/Pittman Tiny BASIC ROM

Standard RS232 connector for terminal

Kansas City standard audio cassette I/O

Shielded 110V section

Solderless breadboarding sockets

Hexidecimal pad

Terminal monitor ROM

Connector cable for ET-3400

Add up to 4K user RAM

Learn computer architecture, interfacing and programming concepts with our versatile Computer Trainer and Trainer Accessory

The ET-3400 Computer Trainer and ETA-3400 Microprocessor Trainer Accessory provide complete, low-cost computing capacity ideal for practice or practical programming. The Trainer is designed for use with the EE-3401 Microprocessor Self-Instruction Program on the opposite page. It provides all you need to learn the fundamentals of microprocessor programming and interfacing, and enables you to perform experiments in the EE-3401 Program. Once you complete the EE-3401 experiments, add the ETA-3400 Trainer Accessory and a terminal such as the H9 or H19, for a complete system.

1 ET-3400 Microprocessor Trainer

Functioning as a miniature digital computer, the ET-3400 Microprocessor Trainer is used for the experiments in the EE-3401 Self-Instruction Program. The ET-3400 features a built-in 1K ROM monitor program for controlling unit operation. 6-digit hexadecimal 7-segment LED display for address and data readout. 17-key hexadecimal keyboard permits access of memory location to examine contents, then step forward or backward from that memory location to examine more memory locations, to change a memory location, to examine and/or alter any of the MC6800 CPU's internal registers, to set break points for program debugging, or to reset the CPU. The flexible instruction set of the MC6800 permits relative addressing, and makes use of two accumulators.

The ET-3400 has 256 bytes of random access memory (RAM) built-in, and is expandable to 512 bytes with the RAM's supplied in the EE-3401 Self-Instruction Program. It also has 8 buffered binary LED's for display of breadboard logic states, 8 SPST DIP switches for binary input to breadboarding circuits, a breadboarding socket for prototyping; interfacing

and memory circuits. All microprocessor address, control and data busses are buffered and terminated on the front panel for ease of connection to proto-typed circuits. There's also provision for a 40-pin external connector to expand memory and I/O capacity. The Heathkit ET-3400 Microprocessor Trainer features built-in +5, +12 and −12 volt power supplies. Power requirement: 120/240 volts, 60/50 Hz, 30 watts maximum. The unit measures 3½" H x 12⅛" W x 11¾" D.

After completing the EE-3401 Self-Instruction Program, you will find the ET-3400 Trainer ideal for breadboarding, prototyping and system design. Team it up with the ETA-3400 (below) for real computing power.

Microprocessor Trainer.
Kit ET-3400, Shpg. wt. 7 lbs. **199.95**
Factory assembled and tested.
ETW-3400, Shpg. wt. 6 lbs. **275.00**

2 ETA-3400 Trainer Accessory

Turn your Microprocessor Trainer into a complete system with the ETA-3400 Accessory. It provides more computing power with an additional 1K bytes of memory so you can run longer and more sophisticated programs through the ET-3400. The memory can be expanded to 4K bytes with the optional 3K chip set (ET-3400-1. Order the chip set from the listing at the right.

A serial I/O with EIA or 20 mA loop format in the Accessory lets you hook up a terminal such as the H9, or a 20 mA ASCII teletype machine. It also provides an audio cassette interface so you can store programs on convenient cassettes. The ROM monitor/debugger program lets you implement the standard trainer monitor functions through the external terminal. Memory locations can be examined or changed, break points can be initiated, and program

debugging can be accomplished with a single instruction step feature.

A Tiny BASIC interpreter is provided in ROM to let you program using BASIC (See EC-1100 BASIC Program on page 85). Tiny BASIC features 26 variables (A-Z), integer math, 15 BASIC statements and two functions: random and user. User function allows you to run machine code routines from BASIC — the same machine code routines you learn to write in the EE-3401 Self-Instruction Program.

The Accessory connects to the Trainer by means of a 40-pin ribbon cable supplied. Parts required to modify the Trainer are included. Since this modification changes the clock frequency of the Trainer, the experiments in the Microprocessor Self-Instruction Program using timing loops will be changed. It is recommended that all of the EE-3401 experiments be completed before adding this modification kit. The cabinet of the Accessory measures 3" H x 11" W x 12" D. 120/240 VAC, 60/50 Hz. 11 watts.

Microprocessor Trainer Accessory.
Kit ETA-3400, Shpg. wt. 8 lbs. **150.00**
Factory assembled and tested.
EWA-3400, Shpg. wt. 8 lbs. **250.00**
Optional 3K Chip Set.
ETA-3400-1, Shpg. wt. 1 lb. **47.00**

Versatility makes the ET-3400 a great value now — and later!

Use the ET-3400 Microprocessor Trainer to learn microcomputer programming now (with the EE-3401 Self-Instruction Program), then use the ETA-3400 Microprocessor Trainer Accessory to convert the Trainer to a full personal computer system.

NOTE: A terminal such as the H9 is required to use the BASIC and monitor software with the trainer accessory. See page 80 for details on the H9.
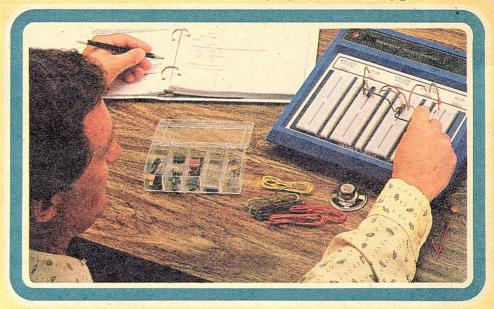
We make it easier to learn advanced electronics

New Heathkit Continuing Education Programs can expand your electronic horizons

The new Heathkit Advanced Electronics Programs are effective multimedia self-instruction programs that make learning a variety of electronic subjects fast, fun and effective. The text lets you read at your own pace in easy-to-understand, step-by-step segments. Large, illustrated visual materials make learning more effective. And the optional Heathkit ET-3300 Electronic Trainer gives you actual hands-on experience with the electronic components and circuits discussed in the Advanced Electronics Programs.

Whether you're a technician/engineer interested in self-improvement, a student looking for advanced electronics knowledge or a hobbyist interested in new electronic developments, these programs are designed for you!

Learn about Op Amps, one of today's most important integrated circuits

The new Operational Amplifier Program makes it easy to gain in-depth understanding of one of the most commonly used integrated circuits. Because op amps are being used more and more, you will be working with them more. This program gives you the experience you need to know how they work and how they can work for you.

A 385-page self-instruction text, with test questions at the end of each unit, takes you step-by-step through the design and operation of operational-amp circuits. At the end of each unit, a series of experiments are outlined for you to perform: The experiments require circuit parts, like resistors, capacitors, diodes, transistors, indicator lights and IC's — all of which are included in the program. Desirable options for the experiments are the ET-3300 Lab Breadboard (listed below), and an oscilloscope like the Heathkit IO-4105 (see page 70), a multimeter like the IM-1104 (see page 62) and a frequency generator like the IG-1271 (see page 63).

The text, reinforced by test questions and experiments, teaches you how to measure and compute common op-amp parameters, how to design basic op-amp linear circuits, how to design integrator and differential circuits, and how to design and predict the performance of op-amp constant current sources, current-to-voltage convertors and voltage-to-current convertors — and much more. Even the popular Norton and BiFET operational amplifiers are covered in depth in this program. When you pass the optional final examination, 3.0 Continuing Education Units will be awarded for your efforts. You'll find Op Amps easier to understand if you complete the Basic Electronics Series (EE-3101 through 3104, page 5) or have equivalent knowledge.

EE-101, Shpg. wt. 5 lbs.		39.95
Kit ET-3300, Breadboard, wt. 6 lbs.		89.95
Assembled ETW-3300, 6 lbs.		149.95

New Active Filters Program makes in-depth learning of this new design easy

This new program provides a complete understanding of a very critical element in circuit design — the active filter. The significant advantages of active filters over passive LC networks are making them more and more common in electronic devices. This new program is designed to give you a thorough grasp of the subject.

The new Active Filters Program includes a 300-page self-instruction text describing the design, operation and uses of active filters. Test questions at the end of each unit assure thorough understanding. Also, at the end of each unit, a series of optional experiments give you hands-on experience with active filters. A complete package of parts is included for use in the experiments.

You teach yourself how to design active filters with op amps, how to plot and predict frequency responses, how to design and breadboard first-order low-pass, and high-pass filters. Later units teach how to design and build second-order and higher-order filters, as well as bandpass and state variable filters. It's helpful to complete EE-101 Op Amp, or have equivalent knowledge before starting Active Filters.

To complete the experiments, desirable options include the ET-3300 Laboratory Breadboard (listed below) or the ET-3100 Experimenter/Trainer (see page 6) (NOTE: The ET-3100 Trainer can not be used with the other Advanced Electronics programs), an oscilloscope like the IO-4105 (see page 71), a multimeter like the IM-1104 (see page 62) and a frequency generator like the IG-1271 (see page 63). Upon completion of the optional final examination with a score of 70% or better, 3.0 Continuing Education Units (CEUs) will be awarded.

EE-102, Shpg. wt. 5 lbs.		29.95
Kit ET-3300, Breadboard, Shpg. wt. 6 lbs.		89.95
Assembled ETW-3300, 6 lbs.		149.95

We put the latest technology within your reach

Our newest self-instruction program introduces you to the useful IC timer

If you're a technician, service specialist or engineer who needs to know about timing devices and their usefulness in all types of everyday devices, the new Heathkit IC (Integrated Circuit) Timers Self-Instruction Program is for you. You should complete EE-3201 Advanced Digital Techniques (page 7) before you start IC Timers, or have equivalent knowledge.

Our newest program introduces you to common IC timers, how each works, what they do and where they're used.
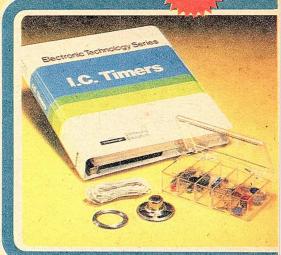
You'll learn about the 555 general-purpose IC timer, the 556 general-purpose timer, the 322 and 3905 wide-range, precision, monostable timers and programmable timer/counters (including the 2240 binary programmable timer/counter, the 2250 BCD programmable timer/counter and the 8260 seconds/minutes/hours BCD programmable timer/counter) with the help of a 348-page text, test questions and optional experiments.

The optional experiments also show you the many uses of IC timers — including logic functions, output drive circuits, time-delay relay circuits, wide-range pulse generators, voltage/frequency converters, free-wheeling, power-fail oscillators, sine-wave/square-wave oscillator, universal appliance timers, speed alarms, burglar alarms, alarm indicators, power-monitor error detectors, phase-locked loops and as precise clock sources.

Electronic parts required to perform the optional experiments are included. Also useful for the optional experiments is the ET-3300 Breadboard (below), an oscilloscope like the IO-4105 (page 70) and a multimeter like the IM-1210 (page 66).

When you pass the optional final exam, you'll receive 3.0 CEUs and a Certificate of Achievement.

EE-103, Shpg. wt. 5 lbs. 39.95
Kit ET-3300, Breadboard, Shpg. wt. 6 lbs. 89.95
ETW-3300, Assembled Breadboard, 6 lbs. . . .149.95

Learn about Phase-Locked Loops with this new self-instruction program

As growing technology requires more versatility from electronic devices, phase-locked loops (PLLs) become more popular. PLLs are widely used in television receivers — to lock in the picture, ensure more accurate color reproduction and as demodulators to convert audio signals to sound. You'll find PLL frequency synthesizers in FM receivers, providing more reliable, more stable reception. PLL synthesizers in 40-channel CB and 2-meter FM transceivers let one crystal do the work of 40 or 50.
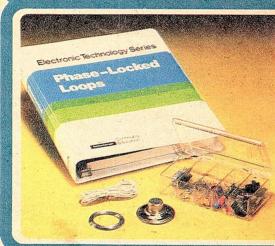
You need to know about phase-locked loops to know how these state-of-the-art electronic devices work. And Heath's new Phase-Locked Loops Learning Program can show you the way. Before starting this program, you should complete the EE-3101 through EE-3104 Basic Electronics Programs (page 5) and the EE-3201 Digital Techniques Program (page 7), or have equivalent knowledge.

The extensive 268-page text teaches you the general principles of phase-locked loops and their build-ing blocks — the phase detector, loop filter and voltage-controlled oscillator. At the end of each unit, you can perform optional experiments to gain hands-on knowledge of PLLs. Electronic parts necessary to complete the optional experiments are included in the program.

To perform the optional experiments, select the optional ET/ETW-3300 Breadboard (below), a DC voltmeter like the IM-5284 (page 57) and a single-channel oscilloscope like the IO-4105 (page 70). To get more from the program, Heath recommends a dual-channel scope like the IO-4205 (page 70) and an audio signal generator like the IG-5218 (page 63).

When you complete this program, pass the optional final examination and you'll receive 3.0 CEUs and a Certificate of Achievement.

EE-104, Shpg. wt. 5 lbs. 49.95
Kit ET-3300, Breadboard, Shpg. wt. 6 lbs. 89.95
ETW-3300, Assembled Breadboard, 6 lbs. . . .149.95

Self-powered breadboard makes learning electronics easier
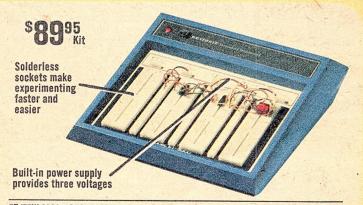
The Heathkit ET-3300 Laboratory Circuit Breadboard is a great convenience tool for electronics learning or circuit design tasks. It's ideal for performing the experiments connected with any of the Heathkit Electronics Self-Instruction Programs on these two pages. Or perform your own experiments, test electronic components or design your own circuits.

The solderless sockets of the Breadboard make your work easier and simpler. The Laboratory Circuit Breadboard is designed to accept almost any electronic part. For example, each breadboarding socket is designed to accommodate any size dual in-line integrated circuit package. And an integrated circuit puller is supplied with the ET-3300. It gently and easily lifts an integrated circuit from the connectors, without damage.

A reliable built-in power supply provides +5 VDC (±4%), +12 VDC (variable) or −12 VDC (±2%) power to the breadboard, with fixed current limiting of each supply at rated current providing protection against shorts.

Building and using the Laboratory Breadboard can help you expand and define your electronic knowledge. Desirable with EE-103 and EE-104 (above) and EE-101 (opposite). Can be used with EE-102 (opposite).

Kit ET-3300, Shpg. wt. 6 lbs. 89.95
Fully Assembled Laboratory Circuit Breadboard.
ETW-3300, Shpg. wt. 6 lbs. 149.95

$89.95 Kit

Solderless sockets make experimenting faster and easier

Built-in power supply provides three voltages

ET/ETW-3300 SPECIFICATIONS: Power Supplies: Output Voltages: +5 volts DC, ±4 percent, at 1.5 amps; +12 volts DC, adjustable, at 100 mA; −12 VDC, ±2 percent, at 100 mA. Load Regulation: Less than 2 percent variation from no load to full load on 5-volt or 12-volt supplies. Current Limiting: Fixed current limiting of each supply at rated current. Power Requirement: 120 VAC, 50/60 Hz, 30 W at full load (240 VAC with internal wire change). Dimensions: 3.5″ H x 12″ W x 12″ D (8.9 cm H x 30.5 cm W x 30.5 cm D).

11

Heathkit practical math programs help you learn the math

Our unique audio-tutorial learning method makes it easy to learn basic math skills you need for business or school

Teach yourself the metric system, soon to become the official system of weights and measurements in the U.S. Review the math you learned in high school or the first year of college. Or learn important algebra and trigonometry concepts on which much of modern engineering is based. The audio-tutorial learning method and the College Level Examination Program (CLEP) make it more worthwhile than ever.
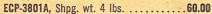
Our audio-tutorial learning method gives extra emphasis to important subject matter, which means you can learn math concepts faster and easier than before. Cassette tapes help guide you through understandable text material, written in everyday language. You see and hear each math concept as it is presented. You advance through each program by completing examples while the discussion of the example is in progress on the tape. You work along with the narration as new skills are introduced. And you also complete exercises independently of the tapes. Continuous interaction between you and the subject material makes your educational experience faster and more thorough.

We can help you earn CLEP college credit. The College Level Examination Program (CLEP) enables students to earn college credit by examination, recognizing college-level achievement acquired outside the conventional classroom. Anyone can take CLEP tests to demonstrate college-level abilities gained through employment experience, military/industrial/business training or advanced work in high school courses or non-credit adult programs — including the Heathkit Continuing Education Series. Our Algebra series (EM-3, 4 and 5, opposite) will help you prepare for the CLEP College Algebra Exam. Use the Trigonometry Program (EM-6, opposite) before the CLEP Trig Exam. Or take both Statistics programs (EM-7 and 8, opposite) to prepare for the CLEP Statistics Exam.

With today's high costs of college tuition, room and board, CLEP can save a student real money and help a student get a degree sooner. Hundreds of colleges and universities honor CLEP test scores for credit. To obtain a list of those institutions, and for more information on the CLEP Program, write The College Board, P.O. Box 1822, Princeton, NJ 08541.

Advanced Texas Instruments TI-50 Scientific Calculator

Advanced capability and quality in an attractive package. The TI-50 is a powerful scientific calculator with statistics — and the most commonly used logarithmic and trigonometric operations, making it ideal for use with Heathkit practical math programs, as well as other Heathkit educational courses. Sixty functions automatically handle a wide range of problems, while scientific notation lets you work any number with ease.

EMA-10, Shpg. wt. 1 lb. **39.95**

Cassette Tape Recorder/Player

The ECP-3801A Cassette Tape Recorder/Player is recommended for use with Heathkit educational programs containing audio cassettes. Easy-to-reach pushbuttons control play, rewind, fast forward, stop, eject and record functions. The ECP-3801A also has a built-in condenser microphone and a built-in three-digit counter with reset button. This Heath-recommended Cassette Recorder/Player is factory assembled and wired; not a kit.

ECP-3801A, Shpg. wt. 4 lbs. **60.00**

The TI Programmable 59 Calculator — the super-powerful card programmable

The TI-59 offers the most advanced features available anywhere. Computer-like power and versatility with subroutines, looping, editing capabilities and much more. Interchangeable Solid State Software™ modules expand capability and flexibility. Or develop programs yourself. Includes master library with 25 prewritten applications programs.

EMA-20, Shpg. wt. 5 lbs. **249.95**

skills necessary to you every day—and earn college credit, too

Math Tutorials for Science and Technology

Get a quick review of the fundamental mathematical skills that you need in your work every day. In 12 self-contained programmed workbooks, you get a complete review of the mathematical skills you learned in high school and college.

The course covers arithmetic and signed numbers, powers and roots, scientific notation, arithmetic in scientific notation, units and rounding, graphs, ratios and proportions, introduction to algebra, solving equations, triangle trigonometry, vectors, probability and statistics.

Upon completion of this program and passing the optional final examination with a score of 70% or better, you'll receive 4.0 Continuing Education Units (CEUs) and a Certificate of Achievement.

EM-1, Shpg. wt. 9 lbs. **39.95**

Now it's easier than ever to Think Metric, U.S.A.

The metric system is the most common system of weights and measures. Soon, it will become the official system of weights and measures in the U.S., and every American will need to know it.

We make learning the metric system fun and easy with Think Metric, U.S.A. This program introduces you to the most commonly used metric terms, provides examples of what you'll be measuring when you use the new system, helps you compare metric terms to familiar terms and provides practical examples of using the metric system.

The material is presented in a three-ring binder and includes an audio cassette that reinforces the text material.

When you complete the course and pass the optional final exam (70% or better), you'll earn 1.0 CEU and a Certificate of Achievement.

EM-2, Shpg. wt. 4 lbs. **19.95**

Learn the alegbra you need today

Use these three self-instruction programs to gain a complete background in algebra. The programs include self-review quizzes and audio cassettes to further explain and reinforce your knowledge.

Algebra Fundamentals reviews basic algebraic skills. A three-ring binder for the text and seven cassette tapes are included. This program covers integer arithmetic, substance of algebra, proportional reasoning, graphs, divisions and multiples, fractions, roots and real numbers. Upon completion of the program and passing the optional final exam, you'll receive 2.5 CEUs and a Certificate of Achievement.

EM-3, Shpg. wt. 6 lbs. **49.95**

Algebra provides a working knowledge of algebra. Eight modular sections, a workbook and 10 audio cassettes are housed in two attractive binders. The program covers polynominal arithmetic, factoring, algebraic functions, exponents and radicals, linear equations and inequalities in one variable, quadratic equations and inequalities in one variable, probability, sets and operations. Upon passing the optional final examination with a 70% or better score, you'll receive 3.0 CEUs and a Certificate of Achievement.

EM-4, Shpg. wt. 7 lbs. **49.95**

Intermediate Algebra covers advanced problems and theories. The text material and nine audio cassettes are provided. This program covers functions, relations and inverses, graphs and variation, linear relations, quadratic relations, systems of equations and inequalities, determinants, logarithms, sequences and series. When you pass the optional final examination with a score of 70% or better, you'll receive 3.5 CEUs and a Certificate of Achievement.

EM-5, Shpg. wt. 7 lbs. **49.95**

Learn the fundamentals of trigonometry

You need trigonometry to analyze alternating current, as well as more complex mathematical, circular and angular problems — and we make understanding this college-level material easier than ever.

The Trigonometry Program includes two three-ring binders for the text, and nine cassette tapes to reinforce the text material. It's a natural step forward from algebra, and requires the successful completion of our EM-5 Intermediate Algebra course (left) or equivalent knowledge. A basic knowledge of geometry is helpful, too.

You'll learn about circular functions, graphs of circular functions, identities and proofs, inverse functions, conditional equations, right triangle trigonometry, the solution of right triangles, polar coordinates and parametric equations, vectors and complex numbers.

You can learn first-year college trigonometry in depth — taking the time you need to really learn trig fundamentals. Supplement what you learn in school — or prepare for the CLEP Trig examination, where you can earn college credit for what you learn outside the classroom.

Upon passing the optional final examination, you will receive 4.0 CEUs and a Certificate of Achievement.

EM-6, Shpg. wt. 7 lbs. **49.95**

Descriptive Statistics and Probability Distributions

NEW

Designed especially for people who need to know statistics — but don't have a strong math background. Abstraction and symbolism are kept to a minimum, while concepts, rules and processes are thoroughly presented.

Before starting Descriptive Statistics and Probability Distributions, you should complete our Algebra Fundamentals course (EM-3, left) or have equivalent knowledge.

This self-instruction program includes seven units of text in a three-ring binder, with another binder containing seven cassette tapes.

You'll learn about frequency distributions and graphs, special frequency distributions, frequency polygons, measures of central tendency, measures of variability, basic probability, the binominal distribution and the normal distribution.

The optional EMA-10 Calculator (opposite page) has statistical functions needed to complete this course and EM-8 below. When you pass the optional final exam, you'll receive 3.0 CEUs and a Certificate of Achievement.

EM-7, Shpg. wt. 6 lbs. **49.95**

Inferential Statistics advances your knowledge

NEW

Our new Inferential Statistics Program introduces you to more advanced statistical concepts and problems. You'll gain knowledge about sampling and sample statistics, hypothesis testing, estimating population parameters, the t distribution, linear correlation, linear regression, the chi square distribution, the F distribution and nonparametric tests.

The optional EMA-10 Calculator (opposite page) has statistical functions necessary to complete this course and EM-7 above. When you complete Inferential Statistics and pass the optional final examination with a score of 70% or better, you'll receive 3.5 Continuing Education Units (CEUs) and a Certificate of Achievement.

EM-8, Shpg. wt. 8 lbs. **59.95**

> **Our new Descriptive Statistics/Probability Distributions and Inferential Statistics Programs help you prepare for the CLEP Statistics Examination, where you can earn college credit for what you learn outside the classroom.**

13

Now student or traveler can learn languages faster

NEW

Learn French, Spanish, Italian or German efficiently with Berlitz®

$95.00

- Each program features over six hours of audio tape guidance
- Comprehensive to fill student, tourist or business needs
- Fifty lessons in each language from the acknowledged leader
- Next to being in a foreign country, the best way to learn

Going to a foreign country? Or want to get top grades in high school or college language classes? Here's good news. These four Berlitz self-instruction language programs make your language-learning the next best thing to being in a foreign country — so you can converse with people in foreign lands as soon as you step off the plane. Selected to be part of the Heathkit line because it meets the high standards of Heathkit Continuing Education, Berlitz uses the techniques that have made it the leader in its field for nearly 100 years.

Each of these four programs features six "speak along" audio cassettes keyed to workbooks. Each cassette has its own, 50-page workbook of easy-to-follow, concise information to help you learn and understand what you're hearing on the tape. The six tapes present 50 lessons that place you in real-life situations you will encounter in your travels — dealing with customs officials or waiters, for example, or shopping for souvenirs or essentials. Lessons on business teach you the special terms and phrases used in banking, law and other areas of commerce. Berlitz helps you learn a practical, comprehensive command of the language you study.

You...and your entire family can learn French, German, Spanish or Italian at home with these comprehensive programs. Knowledge of a foreign language is valuable to the tourist or to the student striving for higher grades. Furthermore, it's a real asset in the business world. The ability to converse and transact business in another language can earn you real respect from foreign business and government officials, and make you more valuable to your company.

Learning with these programs is easy, and fun, too. Not only are the lessons based on real-life situations, but Berlitz has designed them to give you a flavor of the customs and traditions of each country as you learn the language. So you get a little of the romance of France, the passion of Spain; a feeling for the grandeur of Germany or the festivity of Italy.

To further enhance your learning experience, Berlitz uses a variety of native speakers to accustom your ear to the languages, and to assure you of learning the precise pronunciation, accent and rhythm so essential to mastery of a foreign language.

The Berlitz method of individual instruction offers you many advantages over traditional classroom methods. You progress at your own speed. If you want to cover another lesson, you aren't held up by slower classmates. But if you want to hear a certain phrase again, simply rewind the tape — in an instant you can review it so you get the pronunciation right while it's still fresh in your mind. Used with a portable cassette player such as our ECP-3801A, listed below, a Berlitz program allows you to practice your growing language ability while you shave, prepare meals... or even while commuting to and from work.

Make language-learning a family project with your Berlitz language program, and give your child an educational boost. It's an established fact that children have the ability to learn a foreign language every bit as quickly as adults. Furthermore, as many educators know, learning a foreign language also enhances an individual's ability to use his or her mother tongue. So give your child an educational headstart with these Berlitz Language Programs.

Each Program includes one 90-minute audio cassette, five 60-minute cassettes, six 50-page workbooks and a Rotary Verb Finder. The Verb Finder makes it easy to learn verb conjugation in the foreign language you are studying. Each Berlitz Language Program comes attractively packaged in a handsome briefcase.

EL-201, French, Shpg. wt. 8 lbs.		95.00
EL-202, German, Shpg. wt. 8 lbs.		95.00
EL-203, Spanish, Shpg. wt. 8 lbs.		95.00
EL-204, Italian, Shpg. wt. 8 lbs.		95.00
ECP-3801A, Assembled Cassette Recorder/Player, wt. 4 lbs.		60.00

Amazing Electronic Translator actually speaks French, Spanish or German

$299.95

An electronic breakthrough called Solid State Speech™ lets this Language Translator actually speak foreign words, phrases and sentences to aid you in your language studies or travels.

Amazing is the only word — in any language — to describe the exciting new ET-200 Electronic Language Translator from Texas Instruments. This handheld electronic marvel **actually speaks** and displays words, phrases and sentences in foreign languages and English. Plug-in modules (offered separately below) give you more than a thousand phrases in Spanish, French, or German...and other language modules are on the way.
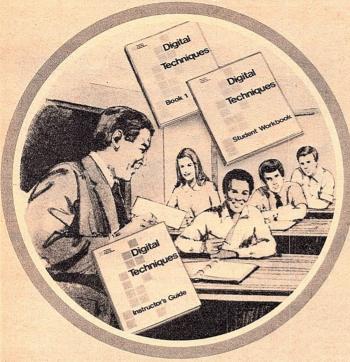
No more eating boiled squid when you thought you ordered a hamburger in foreign restaurants. Your Language Translator gives you instant access to the most commonly used expressions and statements you need. It lets you build more than a thousand fill-in-the-blank statements such as "I would like _____." (coffee, tea, dessert, etc.). It even gives a translation for words entered letter by letter.

For students, words or translators, the Electronic Translator is a great learning device. You can build vocabulary in 16 useful categories such as food, travel, medical, etc. It even drills you on pronunciation and translation of words you select.

Your fully-assembled Electronic Language Translator comes complete with 110 VAC adapter. Or four AA batteries (not included) make it fully portable. Carrying case, earphone and Word/Phrase guide with instructions included. (Needs at least one language module, below, for operation.)

Team your Language Translator with the Berlitz Language Programs above to become a language whiz.

ET-200, Assembled Translator, Wt. 2 lbs.		299.95
ETA-200-1, French, Module, Wt. 1 lb.		59.95
ETA-200-2, German, Module, Wt. 1 lb.		59.95
ETA-200-3, Spanish, Module, Wt. 1 lb.		59.95

Heathkit Learning Programs designed for classroom teaching

The famous Heathkit electronics learning programs have been completely reformatted for classroom use. Using the instructor's guide, the teacher can add to the information in the program material his own experience and guidance to give the student a fully rounded learning experience.

The programs are broken down into three separate publications for student and teacher convenience. The student text is the core of the learning material. The student workbook with its exams and laboratory experiments, is keyed to the text. The instructor's guide presents the material an orderly fashion.

Along with the publications, separate parts packages contain the electronic components needed to implement the workbook experiments. These parts are required for the experiments in the learning programs. To complete the experiments in DC and AC Electronics, Semiconductor Devices and Electronic Programs the ET-3100 Trainer is required. For the Digital Techniques Program, the ET-3200 Trainer is required. For the Microprocessor Program, the ET-3400 Trainer is required to complete the workbook experiments in the program.

Free brochures are also available detailing the course. Contact Heath Company, Contract Sales Dept. (616) 982-3519 for information and discount schedule.

ATTENTION EDUCATORS: Heath products for education in fully assembled form are available from distributors serving the vo-ed market in the following states. More information and assistance is available at the telephone number listed for your area.

Alabama	205-822-1326	Missouri	913-268-8838
Alaska	907-456-1872	Montana	503-635-3544
Arizona	602-945-6605	Nevada	702-358-0829
Arkansas	205-822-1326	New Hampshire	603-893-4586
California (So.)	714-493-8040	New Jersey	201-528-5637
California (No.)	415-651-6720	New Mexico	602-945-6605
Colorado	303-795-1450	New York	516-354-2983
Connecticut	603-893-4586	North Carolina	919-776-9841
District of Columbia	804-276-9291	North Dakota	612-533-2133
Florida	305-647-5373	Ohio	513-424-4621
Georgia	305-647-5373	Oklahoma	214-361-8665
Hawaii	808-536-0243	Oregon	503-635-3544
Idaho	508-635-3544	Pennsylvania	717-533-4038
Illinois	312-960-0363	Rhode Island	603-893-4586
Indiana	317-293-5704	South Carolina	704-366-4824
Iowa	612-533-2133	South Dakota	612-533-2133
Kansas	913-268-8838	Tennessee	615-794-9687
Kentucky	615-794-9687	Texas	214-361-8665
Louisiana	205-822-1326	Utah	702-358-0829
Maine	603-893-4586	Virginia	804-741-2580
Maryland	804-741-2580	Washington	503-635-3544
Massachusetts	603-893-4586	West Virginia	804-741-2580
Michigan	313-585-2300	Wisconsin	612-533-2133
Minnesota	612-533-2133	Wyoming	303-795-1450
Mississippi	205-822-1326		

Program	Text Shpg. wt. 2 lbs.	Price	Workbook Shpg. wt. 2 lbs.	Price	Instructors' Guide Shpg. wt. 1 lb.	Price	Parts Shpg. wt. 1 lb.	Price	Cassettes Shpg. wt. 1 lb.	Price
DC Electronics	EB-6101	17.95	EB-6101-40	7.95	EB-6101-50	8.95	EB-6101-30	15.95	EEA-3101	9.95
AC Electronics	EB-6102	17.95	EB-6102-40	7.95	EB-6102-50	8.95	EB-6102-30	9.95	EEA-3102	9.95
Semiconductor Devices	EB-6103	17.95	EB-6103-40	7.95	EB-6103-50	8.95	EB-6103-30	9.95	EEA-3103	9.95
Electronic Circuits	EB-6104	19.95	EB-6104-40	8.95	EB-6104-50	8.95	EB-6104-30	21.95	EEA-3104	9.95
Digital Techniques	EB-6201 (3 lbs.)	24.95	EB-6201-40	10.95	EB-6201-50	8.95	EB-6201-30	19.95	EEA-3201	9.95
Microprocessor	EB-6401 (4 lbs.)	19.95	EB-6401-40	8.95	EB-6401-50	8.95	EB-6401-30	49.95	EB-6401-60	12.95

Learn to solder the correct way with this low-cost Heathkit programmed instruction format

ONLY $14.95

Invaluable for novice kitbuilders
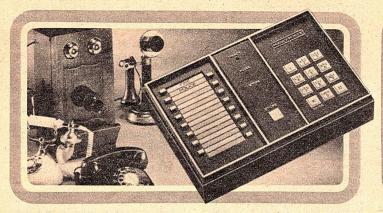
Our Soldering Manual and Kit teach you the techniques for high reliability soldering in electronics applications. Whether you're a kitbuilder, hobbyist or experimenter, it's the perfect way to learn or brush up this skill. Using a proven programmed instruction format, the text covers mechanical connection, tinning, temperature control and much more. And to give you "hands-on" experience, a handy practice kit is included. Requires soldering iron and small hand tools (see page 24).

EI-3133, Shpg. wt. 2 lbs. **14.95**

Classroom version of the Heathkit Automotive Electrical Systems Program in new format for instructor-led group learning

The Heathkit Automotive Electrical Systems Program is now in a new format for classroom use. The student text is the core of the learning material. The student workbook ties into the student text, complete with examinations and experiments. Using the instructor's guide, the teacher can add experience and ideas to the learning material, giving the student a comprehensive learning experience. Separate parts packages contain electronic parts necessary to complete experiments. Filmstrips and cassette tapes also available. For quantity discounts contact Heath Company's Contract Sales Department at (616) 982-3519. Also available from distributors serving vocational education market (see above).

EB-10, Auto Textbook, Shpg. wt. 3 lbs. 12.95

EB-10-30, Parts Pack, Shpg. wt. 2 lbs. 17.95

EB-10-40, Student Workbook, Shpg. wt. 3 lbs. 9.95

EB-10-50, Instructor's Guide, Shpg. wt. 1 lb. 8.95

EB-10-60, Cassette Tapes, Shpg. wt. 1 lb. 17.95

EB-10-70, Filmstrips, Shpg. wt. 1 lb. 29.95
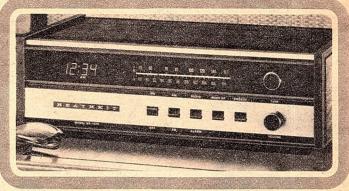
Kits to bring your family convenience and enjoyment

One-Button Phone Dialer
helps you respond fast in emergencies when speed counts!

- Microprocessor-based unit stores up to 16 numbers for quick dialing
- Converts your standard dial telephone to a push-button model
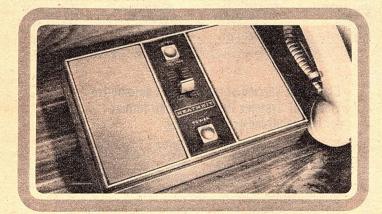
An emergency is no time to be searching for the fire department or police phone number. The Heathkit One-Button Phone Dialer comes to the rescue by dialing a vital number with the push of one button. If the number is busy, you can redial automatically at the push of a single button. Stores up to 16-full 15-digit numbers (enough for area codes, etc.). Easy programming to change numbers. Memory-save circuit maintains stored numbers during power failures (9V battery not included). Converts your standard dial phone to a push-button model compatible with both standard and Touch-Tone™ lines. Connects easily to any modular phone jack. Do not use on party lines or pay phones. Complies with FCC regulations. Easy assembly. 120 VAC, 60 Hz. 2" H x 8¾" W x 5¾" D.
Kit GT-1217, Shpg. wt. 3 lbs. 79.95

Digital Alarm Clock with rich AM/FM sound and beautiful styling

- Stay "on time" even if your electrical power fails, thanks to the built-in "fail safe" circuit
- "Catnap" with the 7-minute snooze button
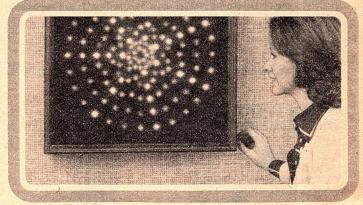
Loaded with convenient features: 24 hour set'n forget alarm, built-in 3" x 5" oval speaker for truly fine sound, and style that fits anywhere. The GR-1075 displays time in the conventional 12-hour format. Shows AM and PM too. A lighted decimal pulsates to indicate seconds and also shows that the alarm is properly set. The 24-hour alarm cycle can wake you with a gentle pulsating, electronic "beep" or with soft music from the FM or AM radio station of your choice. High quality electronics and 5 μV FM and 300 μV/M AM sensitivities make sure you'll "pull-in" a large selection of stations day-or-night. And for the sleepyhead, the clock's 7-minute snooze cycle will give you up to an hour of relaxing catnaps. Two 9-volt batteries (not supplied) take over during power interruptions and keep the clock counting. For 120/240 VAC, 50/60 Hz. 4½" H x 13⅝" W x 8⅛" D.
Kit GR-1075, Shpg. wt. 10 lbs. 139.95

Telephone Amplifier lets you talk and listen with hands free

- Answer the phone by pressing a button, without lifting receiver
- Built-in microphone lets you talk from up to 10 feet away

To answer the phone, press the Power Button; to hang up, press it again. Voice-activated switch changes instantly from talk to listen. Talk from up to 10-ft. away. Requires external phone for operation. Comes with ¼" diameter phone plug, 1¾" square four-pin phone plug and 6' of 4-conductor cable for easy installation. Operates on 9V battery (not included). 2½" H x 8½" W x 5¾" D.
Kit GD-1112, Amplifier, Shpg. wt. 3 lbs. 49.95
PS-2350, 120 VAC converter, Shpg. wt. 1 lb. 4.95
PS-2450, 240 VAC converter, Shpg. wt. 1 lb. 14.95
Customer-owned equipment connected to telephone lines may be subject to local tariff.
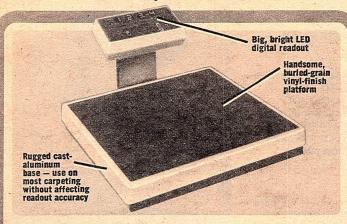
Dazzling Musical Light Show adds more to your sound system

- 140 Lights pulsate in time with the music — every tune different!
- Bach to rock — your records and tapes never said so much before

The Heathkit Light Show adds exciting sights to your sound system. Just connect it to the speaker leads of any sound source (except AM radio). Without affecting the sound, active filters separate the audio signal into four frequency bands, each with 35 brilliantly colored lights — red for bass, blue for low-midrange, green for upper-midrange and amber for treble (140 lights total). It's wild. The lights pulsate in time to the music creating spokes of swirling color. 22¾" H x 22¾" W x 4½" D. For 120/240 VAC. Input is 1 volt RMS min. to 22 volts max. Line isolation provides protection.
Kit TD-1006, Shpg. wt. 34 lbs. 99.95

Easy-to-build kits make life more convenient

Big, bright LED digital readout

Handsome, burled-grain vinyl-finish platform

Rugged cast-aluminum base — use on most carpeting without affecting readout accuracy
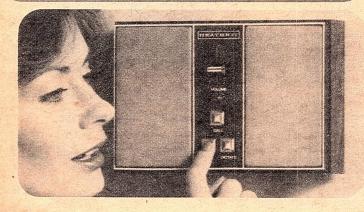
Digital Scale is a real weight-loser's helper!

- Electronic mechanism delivers weights accurate to 2/10 pound
- Battery-operated — weigh with space-age accuracy anywhere

The GD-1186 is an ideal companion, wherever you go. Because the scale is battery-operated, you can take it everywhere. You can even use the GD-1186 safely after a shower. And an electronic strain-gage mechanism eliminates the mechanical springs and weights that can go out of adjustment. Electronic accuracy means you can weigh the baby, without weighing the blanket. And manual adjustment lets you weigh small items accurately. Requires 6 "C" cells (not supplied).

Kit GD-1186, Shpg. wt. 9 lbs. **89.95**
Factory Assembled and Adjusted Electronic Digi-Scale. Readout non-detachable. Reads in pounds only, in increments of 2/10 pound.
GDW-1186, Shpg. wt. 9 lbs. **124.95**

NEW Ultra-convenient Ultrasonic Cleaner

- Tackles those almost-impossible cleaning chores
- Won't interfere with radio or TV reception

The Heathkit GD-1151 Ultrasonic Cleaner makes short work of most hard-to-clean projects. Deep clean watch parts, most jewelry, dentures or any delicate item that could be damaged or otherwise harmed by hard scrubbing, harsh cleaning agents or abrasives. Simply fill the stainless steel tank with any detergent or cleaning solution safe for the item to be cleaned. Place the object or objects in the tank, set the timer and the Ultrasonic Cleaner does the rest. The GD-1151 won't hurt radio or television reception — it meets FCC interference suppression requirements. Tank measures 6" L x 4" W x 2⅜" D. Overall dimensions, 4⅝" H x 5¾" W x 11" L (including lid). For 120 VAC, 60 Hz.
Kit GD-1151, Shpg. wt. 5 lbs. **89.95**

Deluxe FM Wireless Intercom brings you clear communication
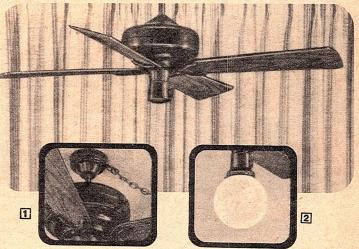
- Phase-locked loop circuit assures quiet operation
- No bothersome wiring hookups — uses your present house wiring

Here's a two-way intercom you can use anywhere indoors — as long as the units are on the same AC power transformer. After assembly simply plug each unit into an AC outlet and you're ready to communicate. Order as many as you like for complete communications — you can even leave them on all the time at very low cost. Phase locked loop circuitry provides quiet, clear operation. Automatic squelch assures noise-free operation; a pleasant call tone alerts other units. A dictate switch locks the intercom in the "talk" mode for hands-free operation. A transmit indicator lights in the talk mode. 3" speaker. Plastic cabinet, 3" H x 8⅝" W x 5¾" D, may be wall mounted. For 120 VAC, 60 Hz.
Kit GD-1114, Shpg. wt. 3 lbs. ....**each 44.95**

Cut heating/cooling costs with an authentic Casablanca Fan

Cuts heating costs by bringing warm air down from high ceiling areas. Helps cool by circulating stagnant air. Variable speed adjustment. For charming effect, add optional kits below. Not for ceilings under 8 ft.
Kit GD-1238, Shpg. wt. 24 lbs. **109.95**
Slow Speed Accessory. GDA-1238-3, 1 lb. **14.95**

1 **Swag-Chain Kit.** Mount your Casablanca fan most anywhere. Includes: 18' antique brass swag chain, gold electrical cord, hardware. **GDA-1238-1,** 4 lbs. **14.95**

2 **Light Kit.** Adds old world charm and dual purpose to your fan. Includes glassware, glassware holder and mounting accessories. **GDA-1238-2,** 3 lbs. **16.95**

The convenience clock...with digital accuracy

Loaded with convenient features
- Snooze alarm
- Automatic brightness adjustment
- Power failure alert
- Value priced

Now a pleasant electronic tone can start your day out right — and at a very low price! The clock features a pleasant blue-green display that automatically adjusts to ambient light conditions and is easily wired to give you the time in either a 12- or 24-hour format. Also, in addition to hours and minutes, the GC-1107 indicates AM and PM, tells you when the alarm is set, and alerts you if the clock has been shut off during power interruptions. The alarm on/off switch is easily accessible at the rear of the cabinet. And a "snooze" button lets you take 9-minute catnaps for up to an hour! A Slow switch and Fast switch let you advance the time for easy, accurate setting. The GC-1107 has a built in speaker and is styled in a handsome simulated woodgrain finish. 2¼" H x 7" W x 4¾" D.

Kit GC-1107, Shpg. wt. 3 lbs. 27.95

Digital electronic "Super-Clocks" for floor or shelf display in your own home

- Automatic dimming circuit adjusts to room light for a charming pleasant glow
- Hour and minute readout can be seen from anywhere in the room
- Handsome glass shelves provide nice display for flowers, knick-knacks, etc.

Add elegance with a "space-age" touch anywhere in your home! The "super-clock" is housed in a stylish cabinet with four smoked glass shelves for plants, books or knick-knacks — and the cabinet is finished in handsome simulated walnut-veneer, laminate with anodized aluminum corner pieces.

The 3¼" high clock digits glow brightly enough to be read even in daylight, and an automatic dimming feature adjusts them to diminishing room light for a charming, subtle display in dim or darkened rooms.

The clock displays hours and minutes, with the center colon pulsing each second. A special power failure indicator circuit pulses the display brightness to show that power has been interrupted and clock must be reset. Time setting is accomplished by easy-to-use fast and slow time advance switches located on the bottom of the clock chassis.

The GC-1195 is an excellent and truly useful selection for the first time kit builder. The manual is clearly written and guides you step-by-step through construction in a manner which is both easy to understand and easy to follow.

The GC-1195 is a handsome addition to most any decor, and a great conversation piece. For even more charm and "Old World" distinction, add our electronic clock chimes accessory (described at right).

Kit GC-1195, Shpg. wt. 58 lbs. 189.95

GC-1195 SPECIFICATIONS: Format: 3½-digit (12-hour) time readout. **Power requirement:** 120 VAC, 50/60 Hz, 30 watts. 240 VAC, 50/60 Hz, 30 watts. **Dimensions:** 60½" H x 14" W x 9½" D.

Our "Super-Clock" in a shelf case

Uses the same electronics and display as the GC-1195 floor clock, but is housed in a good-looking walnut-veneer cabinet suitable for shelf, table or desk-top use. Accepts optional GCA-1195-1 electronic chimes. 6½" H x 12½" W x 6¼" D.

Kit GC-1197, Shpg. wt. 18 lbs. 99.95

Add a super sound to your Super Clock with these synthesized chimes that give you an authentic "Big Ben" chimes sound

Builds into the GC-1195 or GC-1197 to provide rich, electronically synthesized "Big Ben" chimes: 4 notes on the ¼-hour, 8 notes on the ½-hour; 12 notes on the ¾-hour and the full 16-note passage and hour annunciation on the hour. And you can even turn on a reassuring electronic "tick-tock". This easy-to-build addition to your Super Clock features volume and pitch adjustment, sound-delay control, "tick-tock" volume control, built-in speaker.

Kit GCA-1195-1, Shpg. wt. 3 lbs. 69.95

Easy-to-build kits for your safety, health and convenience

The Informer®: ultrasonic intrusion alarm at an affordable price

$54⁹⁵

- "Sees" intruders up to 25 feet away from the unit
- Built-in time delay lets you deactivate alarm
- Use anywhere — fits in with any collection of books

Looks like a book — provides reliable, low-cost security
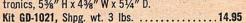
The GD-39 book-size alarm provides good protection. It alerts you to the presence of an intruder up to 25 feet away from the unit. When the GD-39's field of coverage is broken, the unit activates indoor lights, buzzers, bells, etc. A built-in time delay allows you to deactivate the alarm when you enter the room. You can also use the GD-39 as an automatic light switch for your garage, basement or attic. Use it when you want a light or buzzer to alert you to another's entry or to alert you to a child getting out of bed. Solid-state circuitry assures you of many years of reliable, trouble-free operation. Easy-to-build kit.
NOTE: Since the GD-39 operates in the same frequency range as some ultrasonic TV remote controls, interference between the two is possible. 10⅞" H x 2⅜" W x 7½" D. For 120/240 VAC, 50/60 Hz.

Kit GD-39, Shpg. wt. 5 lbs. 54.95
GDA-39-1, Indoor Buzzer Alarm, Shpg. wt. 1 lb. 9.95
GDA-39-2, Outdoor Bell, Shpg. wt. 5 lbs. 26.95

Eye Spy™ Photobeam for low-priced security

Consists of light source, mirror assembly and a photocell-controlled relay. When beam is broken, warning devices or lamps plugged into the photocell are activated. Works up to 25 ft. from reflecting mirror. Electronics, 5⅜" H x 4⅜" W x 5¼" D.
Kit GD-1021, Shpg. wt. 3 lbs. 14.95

Heath-Recommended Home Smoke and Gas Detectors

First-Alert™ Smoke Detector. Easy to mount, has built-in 85 dB horn, 100% solid-state circuit. U.L. Listed.
GD-1414, Assembled Shpg. wt. 2 lbs. 17.95
First-Alert™ Smoke Alarm with Remote Detector. Radio receiver center accepts alarm signals from remote detectors. Wireless.
GDP-1423, Center, 1 Detector. Assembled 6 lbs. 79.95
GDP-1424, Wireless Remote Detector. Assembled 2 lbs. 39.95
First-Alert™ Gas Detector with Electronic Horn. Gives early warning of propane or natural gas leaks. U.L. listed.
GDP-1425, Assembled Shpg. wt. 3 lbs. 39.95

Useful Heathkit Automatic Telephone Security Dialer

$169⁹⁵

Automatically calls a friend, relative or neighbor when alarm is triggered

When you can't reach the phone or don't have time to dial a complete number, press a button and the Security Dialer dials a preselected number. Has automatic redial if line is busy, three-digit location code and separate microphone. Battery-powered if AC fails (Batteries included). 4¾" H x 11" W x 6" D. Check with telephone company for any installation requirements.
Kit GD-1156, Shpg. wt. 7 lbs. 169.95

Digital Stopwatch lets you time any event, anywhere!

Quartz crystal accuracy with seven functions and bright readout

SAVE $20⁰⁰

Reads hours, minutes, tenths and hundredths of seconds in a bright red digital readout that's easy to see in any light. Accurate to ±0.006%. Can be converted to read hundredths of minutes. Includes AC adapter/charger, rechargeable batteries, sunscreen and lanyard. 5⅓" H x 2¼" W x 2" D.
Kit GB-1201, Shpg. wt. 2 lbs. 84.95
ICA-2009-1, Felt-lined Naugahyde® carrying case, Shpg. wt. 1 lb. 3.95
GBS-1201 System. Save $20.00 by purchasing Stopwatch and Carrying Case together. Shpg. wt. 3 lbs. 68.90
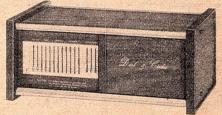
Electronic Flying Insect Killer keeps the bugs from bugging you

$69⁹⁵

- Self-cleaning grid
- Protects up to ⅓ acre from pesky flying insects

Mounts anywhere outdoors and looks handsome near your pool, porch or patio. Ten-watt black light attracts flying insects and electronically charged self-cleaning grid instantly, safely disposes of them. Protective outer screen keeps hands off grid. Attractive flat black and brass-colored housing is corrosion-proof. Operates for only pennies a day. For 120 VAC. 16" H x 11" W x 11" D.
Kit GD-2007, Shpg. wt. 11 lbs. 69.95
GDA-2007-1, Mounting Bracket, Shpg. wt. 2 lbs. 3.95

19

Special kits for a safer, more convenient home

"Programmable" Electronic Doorbell plays favorite 16-beat tunes

$44.95

- Now including song book with over 50 tunes
- Program it for any favorite tune up to 16 beats
- Change tunes easily for any special occasion

What a fun way for guests to announce themselves ...your favorite melody (or theirs) plays when they touch the door button. Use as many as 16 beats to program your favorite tune. Change it whenever you wish...program to celebrate a season, an anniversary, a birthday, even a special party. New song book contains fifty pre-programmed tunes including many college songs.

Changing tunes is easy. Just rearrange the programming leads in the "keyboard" behind the front-panel access door. The assembly manual includes programming instructions for a variety of tunes, or you can compose your own. Controls for tuning, volume, speed, and decay characteristics of the electronically synthesized sound also are located inside the front-panel door.

Easy to build, even if you're a first-time kit builder. Installation is easy too — just connect with your existing bell transformer.

Kit TD-1089, Shpg. wt. 3 lbs. 44.95

Now have remote control of lights or small appliances

only **$14.95** Light Switch

- Sensor Plate mounts anywhere for instant on-off control
- Touch-Control light switch features half-brightness
- Add multiple touch plates
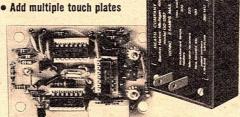
Single circuit board assembly cuts your construction time

1 EVENING KIT
Fast, Easy Assembly

Turn lights and appliances on and off with a touch. Place Touch-Control Switches throughout your home, without adding extra outlets, wall boxes, or rewiring. Simply plug lamp or appliance into the control unit, and plug control unit into an AC outlet. Remote touch plate mounts anywhere and connects to the control unit by easily-concealed wire. 20-ft. of wire included, or use your own for longer runs. You can use more than one touch-plate, too — or use door knob, rail or any other metal as a touch plate. Both switches feature fast, easy single-board construction. 120 VAC, 60 Hz. Touch-Control Light Switch for incandescent lamps up to 150 W. On, off, half-brightness.

Kit GD-1187, Shpg. wt. 1 lb. 14.95

Touch-Control Appliance Switch for TV's to 225 W, fans to 180 W, lamps, heaters to 200 W. Not for use with AM radios.

Kit GD-1287, Shpg. wt. 2 lbs. 15.95

Freezer Alarm guards your valuable food

$14.95 Sensor installs in any freezer to alert you to power failures

Freezer Alarm signals if freezer door is left open or if freezer temperature rises to 20°F even with door closed. Uses two "C" batteries (not supplied). Mounts anywhere with 20-ft. cable supplied.

Kit GD-1183, Shpg. wt. 2 lbs. 14.95
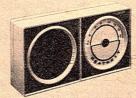
Tabletop Lamp Dimmer saves energy, bulbs

$7.95 You can even add more lights up to 300 watts

A great first-time kit. It adjusts brightness of lamps up to 300 watts, giving your home a decorator touch. Also saves energy and extends bulb life. Makes a great heat control for pencil-type soldering irons.

Kit GD-1018, Shpg. wt. 2 lbs. 7.95

Take along your favorite radio programs everywhere you roam

$14.95

Great-first time kit, this AM Pocket Radio lets you take news, music and sports with you anywhere!

An ideal way to introduce yourself (or a friend) to kitbuilding. 3½" speaker. Uses 9V battery (not supplied). 4" H x 7⅞" W x 2" D.

Kit GR-1008, Shpg. wt. 2 lbs. 14.95

Automatic Lamp Switch for home security

$5.95 Turns lamps on at dusk, off at dawn when you're away

Easy one-evening kit turns lamps on at sundown, off at dawn to give your home a "lived-in" look while you and your family are away. Use with lamps up to 150W.

Kit GD-600, Wt. 2 lbs. 5.95

VOX 70 Automatic Telephone Answerer

Record-a-Call VOX 70 uses standard cassette tape. Voice actuation allows caller to speak without time limit on the recorder. Use it for dictation, too. Fast forward, rapid erase, silent monitor, announce without record, more. Fully assembled. 120 VAC powered.

GDP-1227, Shpg. wt. 12 lbs. 199.95

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Add build-it-yourself security and convenience to your home

Deluxe Garage Door Opener puts an end to leaving your car in nasty weather to open a heavy garage door

$179⁹⁵

- For extra security, your garage door can't be opened by hand from outside the garage once it is closed
- For extra safety, clutch and safety switch return door to open position if it becomes obstructed during closing

Features powerful ⅓ hp motor plus automatic 75 watt dome light

The Heathkit Deluxe Garage Door Opener GD-3309 is an investment that pays off in convenience and security. Is the weather bad? Or is it dark as you pull into your drive late at night? Simply touch the button on the wireless transmitter in your car—your garage door opens automatically and a light turns on in the garage. Touch the button again, and the garage door closes behind you. The GD-3309 features a quiet but powerful ⅓ hp motor that opens the heaviest residential garage doors (up to 7½′ maximum height). When the door is closing, the important adjustable slip clutch safety reverse feature takes over. If the door encounters any obstruction it stops and reverses instantly, and returns to full open position. A separate doorbell-type switch and 20 ft. of cable let you operate the unit from inside the garage or anywhere you choose. The transmitter and receiver are both solid-state and are digitally coded with 256 code combinations so you can set and change your own code anytime. Both the transmitter and receiver are FCC-approved and fully assembled. Use with standard NEC 3-wire systems.

Kit GD-3309C, Transmitter, Receiver, Mechanism.
Shpg. wt. 57 lbs. Motor Freight 179.95

Kit GD-3309D, Two Transmitters, Receiver, Mechanism.
Shpg. wt. 57 lbs. Motor Freight 194.95

Kit GDA-3309-1, Mechanism only. Shpg. wt. 44 lbs. Motor Frt. ..149.95

Kit GDA-3209-2, Adaptor for jamb and pivot doors. 3 lbs. 9.95

GDP-3309A, 1 Transmitter only. Shpg. wt. 1 lb. 24.95

GDP-3319A, Transmitter, 1 Receiver. (3-wire system) 1 lb. 49.95

GDP-3329A, 2 Transmitters, 1 Receiver. (3-wire system) 2 lbs. 64.95

GDA-3309-3, Power Transformer. Allows use of new transmitter and receiver with 2-wire system door openers. 1 lb. 5.95

GD-3309 SPECIFICATIONS: Overall Size: 12″ H x 9″ W x 120″ L. **Motor:** 117 VAC ⅓ HP. **Open and Close Time:** Approx. 12 seconds. **Mounting Clearance:** 3″ above highest point of door travel. **Safety Lamp:** Delay circuit keeps lamp on 1 to 3 minutes. **UHF TRANSMITTER:** Powered by standard 9-volt battery. **RF Frequency:** 310 MHz. **Useful Temperature Range:** −50°F. to +140°F. **UHF Receiver:** Powered by 24 VAC from opener mechanism. Usable on any 3-wire mechanism or 2-wire with addition of GDA-3309-3.

Simple, no-solder assembly

Use separate switch from inside garage or transmitter unit you carry in your car

Handy Heathkit Intercom saves you time and steps

2-Station Master
This master station lets you talk and listen to two remotes anywhere in your home. Price includes one indoor remote (GD-120).
Kit GD-140, Master and Remote,
4 lbs. 49.95

6-Station Master
This master station lets you talk and listen to six remotes anywhere in your home, office or factory. All remotes must be ordered separately. Both GD-110 and GD-140 operate for just pennies a month.
Kit GD-110, 6-Station Master, 5 lbs. 54.95

Accessories
Kit GD-120, Indoor Remote, 2 lbs. 19.95
Kit GD-130, Outdoor Remote. Don't use with GD-140. 2 lbs. 14.95
GDA-110-2, 100-ft. 4-cond. cable. For GD-110, 140. 3 lbs. 9.95
GDA-110-4, 100-ft. 2-cond. outdoor cable. For GD-130. 1 lb. 4.95

Portable Rechargeable Fluorescent Light for home and outdoors

$27⁹⁵

Eliminate the time-consuming inconvenience of buying expensive replacement batteries every time your light goes dim—just when you need it most

Fishing, hunting, camping...or working in the yard, garden, attic or basement—the Portable Rechargeable Fluorescent Light gives you bright illumination without bothersome cords. Built-in rechargeable battery and separate preassembled charger let you use the GD-1246 for hours, then simply plug it into an AC outlet in your home (or into your car's lighter socket using the optional adapter listed below) to restore full power. 9⅜″ H x 3⅛″ W x 4⁵⁄₁₆″ D. Recommended for use above 40°F.

Kit GD-1246, Shpg. wt. 6 lbs. 27.95
12V adapter. Kit GDA-1246-1, wt. 1 lb. 4.95

Transducer for the MI-1030 and MI-1031

Transom mount

Thru-the-hull

Deluxe sounder lets you explore depths to 240-ft. for boating safety and more successful fishing trips

Take this portable sounder with you in any boat and come home with more fish in your cooler

You find fish and know the water depth with the deluxe Dual-range Depth Sounder

For improved fishing and navigation, you need this deluxe Dual-range Depth Sounder. It shows water depth, type of bottom, schools of fish and individual fish. A high-pitched "beep" alerts you to shoals or objects projecting above any preselected depth from 5 to 240 ft. Features switch-selected 0-60 and 0-240 ft. ranges, fixed noise rejection circuit, polarity protection and a super-bright neon indicator. Comes with quick disconnect power and transducer leads. Includes gimbal mount and sturdy Cycolac® case with glare-free bezel and sun shield.

Kit MI-1031-1, with thru-hull transducer, 15' coax, Shpg. wt. 8 lbs. 89.95

Kit MI-1031-2, with transom transducer, 25' coax, Shpg. wt. 8 lbs. 89.95

Heathkit Single-Range Depth Sounder. As above, single 0-240 ft. range, no alarm.

Kit MI-1030-1, with thru-hull transducer and 15' coax, Shpg. wt. 8 lbs. 69.95

Kit MI-1030-2, Single-Range Depth Sounder with transom transducer and 25' coax for easy installation, Shpg. wt. 8 lbs. 69.95

MI-1030 and MI-1031 SPECIFICATIONS: Frequency: approx. 200 kHz. Accuracy: Within 2% of actual depth. Transducer: Barium titanate ceramic element encased in waterproof housing. Power Requirement: 0-60' range, 225 mA @ 11-15 VDC (MI-1031 only), 0-240' range, 125 mA 11-15 VDC with one return pulse. Dimensions: 6½" H x 5¾" W x 7¼" D.

Portable, economy Fish Spotter™ Sounder

Fish swimming between the surface and any preset depth you choose up to 240 ft. will trigger the Fish Spotter's audible alarm. Features two switch-selected ranges (0-60' and 0-240') for sharper definition; noise rejection circuit to eliminate engine ignition interference; bright neon-flasher for precise depth reading. Transducer features a barium titinate ceramic element in encased waterproof housing. Rugged aluminum cabinet. Portable suction-cup transducer bracket. Powered by two 6-volt lantern batteries (not included). 7" H x 6" W x 11" D.

Kit MI-2901, Shpg. wt. 8 lbs. 94.95

Scanning Transducer Bracket: (Not shown.) Designed for use with MI-2901 and MI-2900 Fish Spotter™ sounders. "C" clamp mounting. For 1⅜" cylindrical transducer. Kit MIA-2900-1, Shpg. wt. 4 lbs. .. 24.95

Don't get lost! Radio Direction Finder for safe boating

Stay on course. The MR-1010 keeps you informed on 190-410 kHz longwave beacon band or standard AM. Easy-to-read digital display is bright in direct sunlight, and dims automatically at night for safety and convenience. Finding your bearings is easy, too, thanks to the big azimuth ring marked in 2° increments and a generous 7-inch rod antenna. Lighted meter provides accurate null indications, and a control adjusts meter sensitivity for weak or strong stations. The telescoping sense antenna eliminates 180° ambiguity. Bearing accuracy is an impressive ±3°. Can be used with your boat's 12-15 VDC electrical system, or becomes completely portable with 6 "D" cell flashlight batteries (not included). To prolong battery life, digital readout display automatically shuts off after approximately 20 seconds — but can be recalled instantly.

Heathkit Radio Direction Finder
Kit MR-1010, Shpg. wt. 14 lbs. 229.95

Thermo Spotter® gets you more fish

Catch more fish! The Thermo Spotter Fishing Thermometer shows you the water temperature at any depth up to 100-ft. Simply lower the line, press spring loaded meter button for temperature readout, check depth on cable. Fish temperature charts (included) indicate the kinds of fish likely to be at that level. Completely self-contained with submersible sensing element. Battery-powered meter circuitry in high-impact plastic take-up reel case. Requires one 1.5-volt AA battery (not included).
Kit MI-104, Shpg. wt. 3 lbs. 39.95

Heathkit marine equipment that you can build yourself
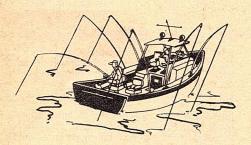
The Heathkit Seeker™ shows you exactly where to find the fish — and it helps you navigate in any weather, too!

- Fish near surface
- Fish at 50 feet
- Fish near bottom
- "White Line" Depth Indication
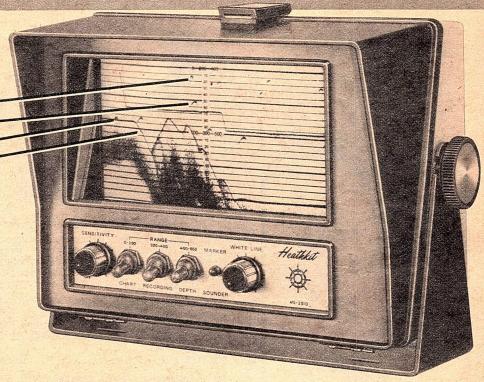
One of the most useful boating and fishing accessories you can own — that's the Heathkit Seeker Chart Recording Depth Sounder. It not only helps you locate the fish, but it also provides a permanent record of the best spots and depths so you can find your favorite spots again and again easily. Its bottom recording accuracy also makes it a valuable navigation aid for following coastline depths and mapping lake bottoms.

The Seeker features an extra-wide beam transducer to allow coverage of a larger area of water than most conventional units. So you get a better and wider "picture" of what's below you. Its three ranges (5' to 200', 200-400', and 400-600') make it useful for any type of boating and fishing area.

Straight line recording system gives you easier, more accurate chart reading and interpretation. A white line control lets you adjust the bottom indication to a fine line so objects or fish close to the bottom can be distinguished easily. A roll of paper lasts approximately 13 hours for continuous charting. And the two-piece case opens easily for convenient paper replacement.

Two lamps light the chart for easy operation at night. The weather-resistant case with gasket seals helps keep recorder water-tight. Universal gimbal mount for easy installation and removal. Operates from boat's 12-volt battery system. 8" H x 11" W x 7" D. With one roll chart paper.

Depart on boating excursions in greater safety; return from fishing forays with more catches. You'll sail in greater confidence when you have the Heathkit Seeker as your boating partner.

Kit MI-2910-1, recorder with through-the-hull transducer and 30' cable. Shpg. wt. 17 lbs. 289.95
Kit MI-2910-2, recorder with transom mount transducer and 30' cable. Shpg. wt. 17 lbs. 289.95
MIA-2910-1, Two Rolls Chart Paper. Shpg. wt. 2 lbs. 9.95

SPECIAL OFFER — SAVE $9.75!
12 Rolls Chart Paper. If pur. sep., $59.70.
MIS-2910-1, Shpg. wt. 12 lbs. 49.95

Foghorn/Hailer, Power Inverter — safe water fun
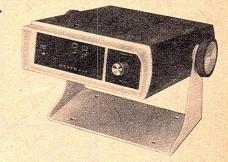
Automatic Foghorn/Hailer features a husky 55-watt amp, deck horn, 20 ft. cable, gimbal mount. 12 VDC. pos. or neg. ground. **Kit MD-19A,** Wt. 15 lbs. 137.95

Kit MDA-19-1, Optional remote speaker for intercom use. Shpg. wt. 2 lbs. 14.95

Economy Power Inverter (not shown). Operates small appliances such as Hi-Fi or TV from 6 or 12-volt input. Up to 175 watts power rating. Not for high starting current or sine wave AC equipment. **Kit MP-10,** Shpg. wt. 8 lbs. 49.95

Protect your hull with this Digital Depth Sounder featuring a "Shallow-Water" Indicator

Don't run aground or risk puncturing your hull. The Heathkit Digital Depth Sounder gives you accurate depth readings at a glance. Dual-range digital display automatically reads depth in 0.1 foot increments from 2.5 to 19.9 feet and in 1 foot increments from 20 to 199 feet. A red light signals clearance of 10 feet or less. Single knob controls power on/off and brightness control. Rugged Cycolac® case; gimbal mounting bracket; 15 feet cable for through-hull installation, 25 feet for transom mount. The Digital Depth Sounder belongs on your boat.

With through-hull transducer,
Kit MI-101-1, Shpg. wt. 7 lbs. 149.95
With transom transducer,
Kit MI-101-2, Shpg. wt. 6 lbs. 149.95

MI-101 SPECIFICATIONS: Accuracy: ±2%, ±1 digit. **Current drain:** 300-500 mA. **Power:** 10-17 VDC @ 500 mA. **Dimensions:** 2¼" H x 6⅝" W x 8½" D (less gimbal).

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Heath-recommended tools for easier kitbuilding

[1] **Kitbuilders' Tool Set.** Includes wire stripper; diagonal side cutter; small long-nose pliers; three screwdrivers (3/32", 1/8", 3/16"); Weller WP-25 soldering iron; nutdriver; nut starter; soldering aid; and solder.
GHP-1270, Shpg. wt. 3 lbs. **29.95**

[2] **Heat Controlled Solder Station.** Weller WTCPN soldering station is transformer powered and features "closed loop" control of tip temperature. Has heat shield, indicator lamp, and sponge. With 700°F soldering iron tip.
GDP-1108, Shpg. wt. 5 lbs. **59.95**

Set of Replacement Tips for above (all 700°F). Set includes: 1/16" Screwdriver, 1/8" Screwdriver, 3/16" Screwdriver, 1/2" Long Conical, 3/64" Long Screwdriver.
GDP-1109, Shpg. wt. 1 lb. **11.95**

[3] **3-Heat Soldering Iron Kit.** Stand with metal cage keeps iron secure. 3 heat settings. Six-foot power cord. 120 VAC.
Kit GH-17A, Shpg. wt. 5 lbs. **34.95**

[4] **Heathkit Nut Driver Set.** 3/16", 1/4", 5/16", 3/8", 11/32", 7/16" sizes.
GDP-204, Shpg. wt. 2 lbs. **13.95**

[5] **Heath-approved Weller 25-Watt Pencil Soldering Iron.** 1/8" chisel tip develops 860° heat.
GDP-207, Shpg. wt. 1 lb. **12.95**

[6] **Solder/de-Solder Set.** As above, with de-solder bulb. Weller 25-watt pencil iron develops 860°. Includes de-solder, bulb.
GDP-1009, Shpg. wt. 1 lb. **12.95**

[7] **Soldering Iron for close work.** Wall 25-watt pencil soldering iron for work on high-density boards. 3-wire cord. For 120 VAC.
GDP-1231, Shpg. wt. 1 lb. **7.95**

[8] **Heath Approved Soldering Iron** for use on high-density circuit boards. 40 watts with standard tip.
GDP-1105, Shpg. wt. 1 lb. **7.95**

[9] **Circuit Board Holder.** Holds most any shape or size circuit board. Spring loaded for quick change. Tilts 220 degrees.
GDP-1254, Shpg. wt. 2 lbs. **18.95**

[10] **Vacuum Base** —Attaches securely to any smooth, non-porous surface. Powerful rubber suction pad holds without marring tabletop. Perfect for tabletop applications where permanent mounting is not practical. Overall height, 3 3/16". Base dimensions, 5" x 4 1/4".
GDP-1252, Shpg. wt. 2 lbs. **17.95**

[11] **Vertical Jaw Vise Head** —For most standard hobby applications. Nylon jaws open to 2 1/4 inches and provide a firm grip on the object to be worked on, without marring.
GDP-1253, Shpg. wt. 2 lbs. **13.95**

[12] **Standard Height Base** —Designed for permanent installation. Three mounting lugs let you attach it securely to the work surface. Choose desired vise head from three styles listed.
GDP-1251, Shpg. wt. 2 lbs. **12.95**

[13] **Vertical Vise Head** —Holds bulkier items —model parts, chassis, etc. Jaws open to 6 1/2". Neoprene pads are reversible and replaceable.
GDP-1255, Shpg. wt. 2 lbs. **13.95**

[14] **Illuminated Magnifier Kit.** Fluorescent lighting and 5" diameter 3 diopter lens take the strain out of close work at your bench. Clamps to horizontal surface. 360° movement, 45" reach. Requires 22-watt T-9 Circline fluorescent tube (not included). Easy mechanical assembly only.
Kit GDP-200, Shpg. wt. 7 lbs. **49.95**

[15] **Extension Lamp Kit.** Extension arm comes assembled. You attach socket, shade and cord. 34" reach, 360° sweep; vented shade, and moveable base clamp. Less bulb.
Kit GDP-202, Shpg. wt. 4 lbs. **17.95**

[16] **Versatile Multi-Outlet Box Kit.** Has 11 switched outlets, 1 unswitched outlet to power all your equipment. All are 3-hole outlets for equipment with ground plugs. Helps keep your shop or hobby bench neat and organized. Includes 12' cord.
Kit HD-1274, Shpg. wt. 4 lbs. **16.95**

[17] **Motor Speed Control.** Ideal for use with any universal motor with rating of 15 watts or less. Saves power, blades, bits, saws, etc. Allows you to use a large drill to cut through steel at slow speed without overheating the motor. (Not for use with Dremel tools).
Kit GD-973A, Shpg. wt. 2 lbs. **24.95**

The GR-2001—beautiful big-screen color for the 80's

A completely automatic home television viewing system is yours with the Heathkit GR-2001

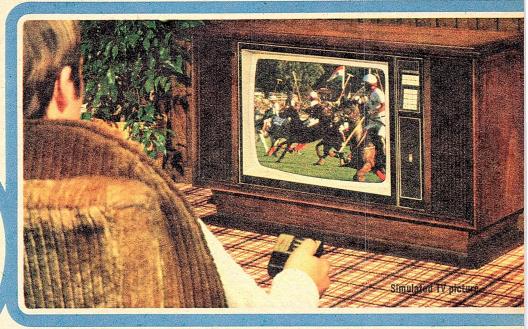Eight programming pushbuttons let you sequence the GR-2001 to change channels and rotate your antenna (with optional GD-1184 Rotor) at times you preselect! Above the pushbuttons, backlit nomenclature shows the current operating mode of the programmer.

Simulated TV picture.

The Heathkit GR-2001 Computer TV System — one of the finest sets you can buy anywhere! This fully-computerized, programmable color TV allows you to turn on your set, pre-program it for an entire evening's viewing, and then just sit back and relax. The optional GD-1185 Programmer automatically changes to the right channel at the right time. You can program up to 32 channel changes in two 12/24-hour periods.

For even more automatic operation, the optional GD-1184 antenna rotator control lets you rotate your antenna to get the best reception. You can select up to 8 separate antenna headings, with up to three stations on each heading.

With all of this programming convenience, the GR-2001 is one of the best performing color TVs on the market. Dozens of circuit improvements and refinements help produce a picture that's vivid, accurate, bright and sharp. The 25' (diagonal) rectangular picture tube is fully shielded to maintain better color purity, and features a black matrix screen. The phase-locked loop vertical and horizontal oscillators provide a picture so rock-steady and adjustment-free we've eliminated conventional horizontal and vertical hold controls. And the audio circuitry has been improved to provide true high-fidelity sound, with 50 Hz to 15 kHz frequency response (±1 dB).

Comprehensive, fully-illustrated assembly manuals guide you through the easy, step-by-step kit assembly of the GR-2001. And famous Heathkit self-service features will let you keep your GR-2001 in perfect shape for years to come.

Our custom-installation option lets you build your GR-2001 into a wall, mount it in your own custom cabinet or order one of our beautifully constructed cabinets on page 26.

Your investment will be returned with year after year of trouble-free performance. Less cabinet. Includes chassis, picture tube and one speaker.

Kit GR-2001, 146 lbs., Motor Freight 749.95
Second Speaker for GR-2001. Fits in space on GR-2001 cabinets where indicated. With all cables.
GRA-2000-7, Shpg. wt. 2 lbs. 9.95

GR-2001 SPECIFICATIONS: Deflection: Magnetic, 90°. **Focus:** Electrostatic. **Convergence:** Magnetic. **Picture IF Carrier:** 45.74 MHz. **Sound IF Carrier:** 41.25 MHz. **Color IF Subcarrier:** 42.17 MHz. **Sound IF Frequency:** 4.5 MHz. **Video IF Bandwidth:** 4.08 MHz, at 6 dB down. **HI-FI Output:** Frequency response: ±1 dB, 50 Hz to 15 kHz. **Output voltage:** Greater than 1.0 V RMS. **Audio Output:** 4Ω or 8Ω, 2 watts. **Power Requirement:** 120 VAC, 60 Hz, 200 W. Compatible with NTSC system only

Our special warranty service plan for solid-state TV modules: During the 90-day warranty period, modules with defective components will be serviced at no charge for parts and labor. If the problem is due to a construction error, the inspection and service charge is $5.00 per module. After the 90-day warranty expires, the service fee is $5.00 per module plus parts. All picture tubes warrantied for 2 years.

8-Channel Tuning System Accessory for your GR-2001. The GRA-2001-9 Tuning System Accessory adds 8 additional channels to the GR-2001's random-access tuning system for 24-channel versatility.
Kit GRA-2001-9, Shpg. wt. 1 lb. 9.95

GD-1185 TV Programmer. Automatically changes channels at any time you select — up to 16 changes in either of two switch-selected 12/24 hour periods. A front-panel keyboard and on-screen readout make it easier for you to enter any time or channel you want. The GD-1185 TV Programmer is the ultimate in convenience — setting your GR-2001 apart from other sets on the market — and it's a Heathkit exclusive. Requires GRA-601 Clock to operate.
Kit GD-1185, Shpg. wt. 9 lbs. 159.95

GRA-2001-6 Remote Control (not shown). Lets you adjust the volume of your GR-2001, turn the set on or off, adjust tint, scan up or down — even turn the optional programmer on or off — all from up to 20 feet from your set.
Kit GRA-2001-6, Shpg. wt. 4 lbs. 99.95
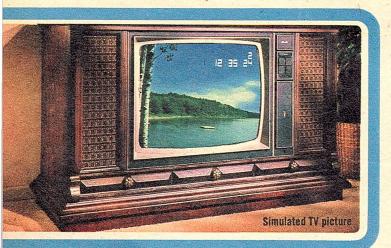
Easy-to-build On-Screen Digital Clock for your GR-2001 Computer Color TV. Displays the time in hours, minutes and seconds, in 12 or 24-hour formats, on your television screen. Easy-to-read 1" high white digits can be adjusted with the channel numbers to remain on permanently or automatically reappear at approximately selected intervals. A useful, versatile addition to your GR-2001 Computer Color TV System.
Kit GRA-601, Shpg. wt. 1 lb. 29.95

Automatic Antenna Rotor Control. Provides better reception by automatically rotating your antenna to get the strongest signal on each channel.
Kit GD-1184, Shpg. wt. 6 lbs. 59.95
Rotor Motor. Requires 5-wire cable (not supplied).
GDA-1184-1, Shpg. wt. 11 lbs. 34.95

Save $49.90 on GR-2001 System with GD-1185 Programmer and GRA-601 Clock. $939.85 if purchased separately.
GRS-2001, 175 lbs., Motor Freight 889.95
Save $59.85 on GR-2001 with Programmer, Clock and GD-1184 Rotor Control. $999.80 separately.
GRS-2002, 187 lbs., Motor Freight ...939.95

25

GR-2000 25" diagonal Color TV for outstanding viewing

$649⁹⁵

The set that brought color TV into the digital age — with on-screen channel display and an optional digital clock

Simulated TV picture

On-Screen Digital Clock for GR-2000

Shows the time in hours, minutes and seconds in bright 1" high white digits right below the on-screen digital channel display. The clock can be set for four-or-six digit readout and 12 or 24-hour format.
Kit GRA-601, Shpg. wt. 1 lb. 29.95

Ultrasonic Remote Control for GR-2000

Lets you watch and control your GR-2000 right from your easy chair. On/off, color controls, digital readout and channels. Includes receiver for in-chassis mounting, hand-held transmitter. Operates up to 20 feet from set. The Ultrasonic Remote Control will add enjoyment and convenience to the operation of your GR-2000.
Kit GRA-2000-6, Shpg. wt. 4 lbs. 99.95

One of the best value color TV's you'll find anywhere — with a host of state-of-the-art features! Has electronic tuning which scans through the preset channels; negative matrix picture screen for extra bright and sharp pictures; fixed IF filter which virtually eliminates adjacent channel interference and never needs alignment; automatic gain control and lots more.

It has famous Heathkit built-in service circuits too — dot generator, purity and convergence circuits, vertical and horizontal centering circuits and a test meter. Easy kit assembly too — with most circuits mounted on plug-in printed circuit boards and factory-assembled wiring harnesses to minimize point-to-point wiring. You can custom-mount your GR-2000 in a wall or your own installation, or you can order one of our fine furniture cabinets below.

The GR-2000 will save you big money, too. Because you build it yourself, you can service it yourself. All the service circuitry you need is built-in. Get even more enjoyment and convenience from your GR-2000 by ordering the optional GRA-601 On-Screen Digital Clock and optional GRA-2000-6 Ultrasonic Remote Control described at right.

Kit GR-2000, Shpg. wt. 147 lbs. Motor Freight 649.95
Second Speaker for GR-2000. Fits in space on GR-2000 cabinets (where indicated). Includes all cables. **GRA-2000-7,** Shpg. wt. 2 lbs. 9.95

GR-2000 SPECIFICATIONS: Picture Tube: 25" (diagonal). **Viewing Area:** 315 sq. in. **Deflection:** Magnetic, 90 degrees. **Antenna Input Impedance: VHF:** 300 Ω balanced or 75 Ω unbalanced. **UHF:** 300 Ω balanced. **Tuning Range:** TV channels 2 through 83. (Preset any 16). **Hi-Fi Output: Output Impedance:** 2000 Ω. **Frequency Response:** ±1 dB, 50 to 15 kHz. **Harmonic Distortion:** Less than 1% at 1 kHz. **Output Voltage:** greater than 1.0V rms. **Audio Output: Output Impedance:** 4 Ω or 8 Ω. **Output Power:** 2 watts. **Dimensions:** 20⅛" H x 29⅛" W x 21¾" D. **Power Requirement:** 110 to 130 volts AC, 60 Hz, 200 watts. **Net Weight:** 112 lbs.
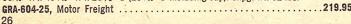
Fine-Furniture Cabinets for your GR-2001 or GR-2000

[1] Contemporary cabinet. This beautiful cabinet will make your Heathkit Color TV a job to behold...even when it's not turned on. Constructed of wood solids and veneers, it features an oiled walnut finish. It has dual speaker capability, too. Comes assembled and finished. 28⅜" H x 46¹³⁄₁₆" W x 20⅝" D (23⅝" D with cup).
GRA-602-25, Shpg. wt. 66 lbs. Motor Freight 199.95

[2] Compact contemporary cabinet. Solidly constructed of wood solids and veneers, beautifully finished in luxurious oiled walnut finish. Comes fully assembled with cutout for one speaker. 34⅜" H x 33⅞" W x 20⅝" D (24⅛" D including cup).
GRA-608-25, Shpg. wt. 65 lbs. Motor Freight 159.95

[3] Early American cabinet. Your GR-2001 or GR-2000 will occupy a place of prestige in any room of your home in this handsome cabinet. Constructed of distressed maple finished wood solids and veneers, it has simulated wood-grain trim. Hardware has Winsor Antique Gold finish. Fully assembled and finished. Has twin speaker capability. 31¾" H x 47⅞" W x 20½" D (23⅜" D including cup). Shpg. wt. 83 lbs.
GRA-603-25, Motor Freight 219.95

[4] Mediterranean cabinet. For a cabinet as sharp as the picture on your Heathkit Color TV, you couldn't make a better choice than this cabinet crafted of wood solids and veneers. Its simulated wood-grain trim and dark oak finish are accented by Antique Gold finish hardware. Fully assembled and finished. Accepts two speakers. 30⅞" H x 49⁹⁄₁₆" W x 20⅞" D (23¹¹⁄₁₆" D including cup). Shpg. wt. 82 lbs.
GRA-604-25, Motor Freight 219.95

Simulated TV pictures

The latest in video technology for exciting TV viewing

GR-500 19" Diagonal Measure Color TV Kit

Simulated TV pictures

In-line gun color TV tube, negative matrix screen, on-screen channel display, hi-fi output. Avoid future repair bills with trouble-shooting meter included.

Kit GR-500, less cabinet. 99 lbs. UPS **499.95**

GRA-500-1, walnut veneer table model cabinet (shown), 17¼" H x 25½" W x 14" D (17" D including cup), Shpg. wt. 28 lbs., UPS **44.95**

GRA-403-18, roll-around cart. 17 lbs. **21.95**

GRA-601, Digital Clock Accessory, 1 lb. **29.95**

GR-2050 21" Diagonal Measure Color TV Kit has a host of fine features

The GR-2050 brings you all the technical excellence and quality design of our famous GR-2000, but in the popular 21" diagonal size. It uses the same optional on-screen clock and remote control as the GR-2000, and it has the same bright, accurate color picture. Modular circuit boards and color-coded wiring harnesses keep point-to-point wiring to a minimum. Built-in service features and adjustment circuits include dot generator, service circuit board, centering and pincushion circuits — so you can save money on service costs.

Kit GR-2050, with chassis, picture tube, one speaker. Shpg. wt. 122 lbs. Motor Freight **599.95**

GRA-2050-1, Contemporary Cabinet. Shpg. wt. 74 lbs. Motor Freight **179.95**

Kit GRA-2000-6, Optional Remote Control, Shpg. wt. 4 lbs. **99.95**

Kit GRA-601, Optional On-Screen Digital Clock. Shpg. wt. 1 lb. **29.95**

Heathkit TV sets and accessories for better viewing

"Super Antenna." This 60-element VHF-UHF-FM antenna is a real signal-grabber. F/B signal rejection: VHF lo, 21 dB; hi, 22 dB; UHF, 22 dB. It features a 171" boom and a 109" turning radius. Weather-protected finish. Includes removable FM blocking elements. Less mast and cable. Motor freight.

GD-1461, 300 ohms, Shpg. wt. 17 lbs. **79.95**
GDS-1461, 75 ohms, Shpg. wt. 16 lbs. **84.95**

"Deluxe Fringe Antenna." Has 28 elements to pull in signals even in problem reception areas. VHF/UHF. 131" boom, 80" turning radius. Less mast, cable.

GD-1441, 300 ohms, Shpg. wt. 10 lbs. **39.95**
GDS-1441, 75 ohms, Shpg. wt. 12 lbs. **44.95**

Cornell-Dubilier Rotator System. Heavy-duty auto-rotator system consists of mast-mount rotator and control box. It pin-points your outdoor antenna on the station for dramatically improved TV and FM reception. The heavy-duty 1 rpm rotator features positive automatic stop and instant reverse. A ½" diameter ball thrust bearing supports antennas up to 150 lbs. Lower mast clamp accepts ⅞" to 2" diameter masts and is removable for direct mounting on rotator plate of tower. Lifetime lubricated bearings. 360° rotator control. 120 VAC. Requires 5-wire cable (not supplied).

GDP-1176, Shpg. wt. 14 lbs. **64.95**

75/300 Ohm Transformer-Splitter. Matches one 75 ohm coaxial cable to separate 300 ohm VHF and UHF leads. 82 channel. Has no-strip, pre-attached leads.

GD-298, Shpg. wt. 1 lb. **4.95**

CB Trap Filter. Is CB interference ruining your TV viewing or FM listening? Most effective single device to cut out CB. 300 ohm impedance. Assembled.

GD-1239, Shpg. wt. 1 lb. **6.95**

Matching Transformer. Converts 300 ohms to 75 ohms for coax. 82 channels.

GD-1054, Shpg. wt. 1 lb. **3.95**

Coaxial Cable. 100 ft. of high quality coax cable with antenna boot and connectors installed. Needs matching transformers at both ends.

GD-328, Shpg. wt. 4 lbs. **12.95**

Get super accuracy in the all-purpose Digital Thermometer

Get accurate temperatures for photo processing, baby's bath, kitchen, dozens of uses. Reads temps from +32 F to +230 F (0 C to +110 C) with 0.5% accuracy. Solid-state microprocessor gives readings in just 10 seconds. Operates for up to one year on one 9V battery (not included). Flashing decimal gives low battery warning. Weighs only 5½ ounces. 2" H x 2½" W x 5" L. Fully assembled; not a kit.

GD-1226, Shpg. wt. 2 lbs. **39.95**

Record up to five hours of TV shows over a two-week period with the feature-packed Zenith VR9000J Video Director

[1] The Zenith Video Director's programmable timer records four different channels over a 14-day period. Daily or weekly repeats of a program are possible up to a total of five hours' recording time. Also, record a program while you watch, or record one while watching another. Remote Video Action Control lets you edit out unwanted scenes...during recording...right from your easy chair. Or stop tape for "freeze action" still pictures. Use Speed Search to view picture at approximately 10 times normal speed to locate the show you want quickly. Speed Search in reverse provides "instant replay." Viewing also possible at three times normal speed. Record or play back using either Beta II or Beta III formats — up to five hours in Beta III. Audio Dub lets you add music and narration to previously recorded tapes. Automatic Indexing, 14-position electronic tuner, more. Accepts optional camera or monitor (below). Includes blank cassette, remote unit, necessary transformers, cables. 120 VAC, 55 watts.

GDZ-9700, Video Tape Recorder (Zenith Model VR-9700J) Assembled and tested. Shpg. wt. 45 lbs. **1249.95**

Videocassettes	Beta II mode	Beta III mode	Weight	Price
GDZ-9700-5	3½ hours	5 hours	1 lb.	22.95
GDZ-9700-4	3 hours	4½ hours	1 lb.	20.95
GDZ-9700-3	2 hours	3 hours	1 lb.	16.95

[2] Sanyo VC-1600X B/W Video Camera. Includes cable and connectors.
GDP-1850, Fully Assembled, tested. Shpg. wt. 10 lbs. **259.95**
GDP-1852, Mounting Bracket for Camera. 2 lbs. **19.95**

[3] Sanyo VM-4209 9" B/W Video Monitor. High-resolution picture.
GDP-1851, Fully Assembled, tested. 17 lbs. **189.95**

COMBO OFFER — SAVE $49.95! Camera and Monitor together. With all cables and connectors. If purchased separately, $449.90.
GDS-1850, 34 lbs. **399.95**

27

The exciting new Heathkit Screen Star Projection TV

Thrill your family. The new Heathkit Screen Star TV puts excitement back in TV viewing. Its sharp, clear picture is 8 times larger than the one you now watch!*

$2195.00

- Three-tube projection for a brighter, more vivid picture
- 6-foot diagonal high-reflectivity, washable viewing screen for a big, bright, lifelike image
- A full 5 watts of clear, low-distortion sound
- Built-in adjustments for easy self-service

HEATH charg-a-kit REVOLVING CHARGE

For the first time, Heath brings its world-famous quality, performance and reliability to you in a TV Projection System you can build yourself! There's nothing better than the new Heathkit Screen Star TV for bringing the theater-like realism of sporting events, movies and entertainment specials into your living room. And the Screen Star gives you the most performance for your TV dollar!

Three-tube projection gives you a brighter, more vivid color picture and provides a wider viewing angle from the projection screen. Both the picture tubes and lenses are the finest available, giving you an unsurpassed state-of-the-art color projection system. Each high-resolution color picture tube beams its image through its own large, high-quality 127 mm f1.0 lens to give you the brightest, sharpest, most beautiful picture!

This image is projected onto a 6-foot diagonal, high-reflectivity viewing screen. The easy-care screen is washable to let you maintain high reflectivity and a bright color picture, and is designed to provide years of enjoyment. The viewing screen is equipped with brackets for mounting on any wall. Or to make your viewing screen free-standing and portable, order the optional GRA-4000-1 Viewing Screen Stand (at right).

The electronics of the Heathkit Screen Star provide a bright, clear, lifelike image for years to come! Automatic Fine Tuning (AFT) and an exclusive Heath LC filter maintain IF alignment and reduce drift, keeping your picture in tune from channel to channel. In fact, the IF amplifier never needs re-alignment! Special black level clamps help to faithfully reproduce every scene, whether it's outdoor sun or moonlight. These clamps maintain constant blacks and grays for more accurate brightness levels. Bridge-type low-voltage power supplies provide superior voltage regulation and better all-around performance. And a ferro-resonant power transformer delivers correct power supply voltages, even in areas where line voltages are too low or too high. Proper voltage regulation means you get constant brightness and picture size — even during voltage brownouts.

The external antenna input is designed to give you clearer, crisper TV reception with less troublesome interference! An internal UHF/VHF splitter means you need only one antenna connection to your GR-4000. This true 75-ohm antenna hookup, combined with complete shielding of the tuners, makes the new Heathkit Screen Star TV ideally suited to hook up to your cable television system. (If you don't have cable TV, get the best reception of TV stations in your area with the antennas, rotor and accessories on page 27).

We've even designed a video input/output panel with an auxiliary 120 VAC outlet that lets you directly connect a video cassette recorder like the Zenith Video Director (see page 27). Direct connection assures higher-quality video.

The major television networks have improved the fidelity of their sound — and with the Heathkit Screen Star you can really hear the difference! The sound system provides a full 5 watts of sound as beautiful, rich, clear and distortion-free as the picture. You can listen through the large 6" x 9" speaker, or use the external speaker jack or the VCR audio output jack — to connect to your stereo system for even better high-fidelity sound!

The Heathkit Screen Star is designed to be energy-efficient. Quick warm-up picture tubes bring the picture up fast — but without high energy consumption — or cost.

All controls on the projector are easy-to-find and easy-to-use. Illuminated channel indicators instantly tell you which of the 82 UHF and VHF channels you're tuned to. And all adjustments, including the focus controls, are on top of the chassis or an easily accessible panel.

You can easily move the Heathkit Screen Star from room to room! The projector's smooth-rolling casters let you move the projector anywhere, easily — even store it out of the way — when not in use. And with the optional GRA-4000-1 Viewing Screen Stand, the lightweight screen can be moved with the same ease. Just place the screen about 8 feet in front of the projector, and you can see lifelike, big-screen color TV.

The new Heathkit Screen Star TV is Heath's easiest-to-build solid-state color TV! It takes just 40 to 50 hours for an intermediate kit builder to assemble. The entire picture tube, yoke and lens units, as well as the high-voltage supply, UHF and VHF tuners, are factory-assembled and adjusted for easier building and more reliable performance. Transistors and integrated circuits plug in for easier assembly and — if needed — simpler testing, adjustment and replacement.

Heath is world-famous for the simplicity and thoroughness of its kit-building manuals — and the Screen Star's assembly manual is no exception! Kit-building is a snap, with the assembly manual taking you every step of the way.

Solid-state reliability means you'll spend less on repair bills. And a complete self-servicing manual, with full illustrations, shows you how to perform your own service and save even more by eliminating costly repair bills! The built-in self-service features make maintenance and repair fast and simple.

A convenient swing-back cabinet on the projector gives you access to make adjustments that can't be made with the easy-to-reach controls on the projector. All convergence controls are located on the upper chassis to simplify adjustments. A built-in crosshatch generator makes it easy to maintain convergence for a sharp picture. The entire chassis conveniently swings back for easy servicing. And a test meter is included for making checks before the TV projector is placed into operation, and to aid you in making more precise adjustments. The test meter can also be used for servicing in the future. With these built-in service features, you can really save money on service calls over the life of your Heathkit Screen Star TV.
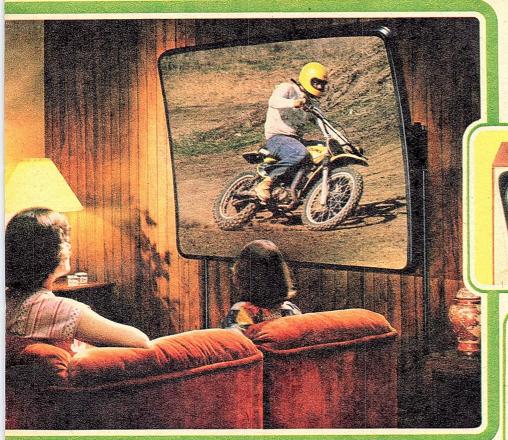
Should you ever run into a problem, however, help is as close as the nearest Heathkit Electronic Center or the Heath factory. You receive complete service support to help you keep your Screen Star in perfect working condition.
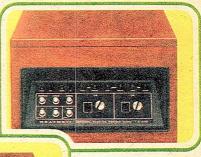
Order today! Get the brightest, sharpest, most beautiful picture in breath-taking big-screen realism — with solid-state reliability and the Heathkit self-service advantage — in the new Heathkit GR-4000 Screen Star Projection TV. Your color television viewing will never be the same again.

Kit GR-4000, Wt. 170 lbs., Mtr. Frt. 2,195.00
Optional Viewing Screen Stand for GR-4000.
GRA-4000-1, Shpg. wt. 18 lbs. 79.95

(*If your present TV is 25" diagonal or smaller.)

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brings big-screen color television right into your living room

Simulated TV picture (Shown with optional screen stand)
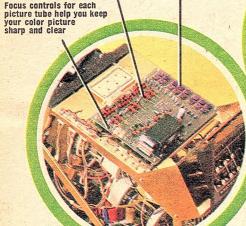
All operating controls are conveniently located on the projector to make operating the Heathkit Screen Star a breeze!

The Screen Star uses the highest-quality f1.0 lenses to beam a brighter, clearer picture!

The Screen Star Color TV Projection Unit is mounted on easy-rolling casters. Move it anywhere when not in use.

The big, high-reflectivity 6-foot diagonal viewing screen is washable. (Shown with optional GRA-4000-1 Viewing Screen Stand)

All convergence controls are located on the upper chassis to make adjustments easier

Chassis swings back for easier servicing

Focus controls for each picture tube help you keep your color picture sharp and clear

Large 6″ x 9″ speaker gives you 5 watts of full-bodied hi-fi sound!

Three high-quality picture tubes — the best way to get the brightest, most beautiful color picture!

The picture tubes, lenses, high-voltage supply and tuners are factory assembled and adjusted to assure more reliable performance

Plug-in ICs and circuit boards make servicing easier than ever!

GR-4000 SPECIFICATIONS: Antenna Input Impedance: 75 ohms, with internal UHF/VHF splitter. Tuning Range: UHF channels 14 through 83, VHF channels 2 through 13. AFT Pull-In Range: 0.7 to −1.8 MHz. Audio Output: 5 W at speaker and external 8-ohm speaker jack. Total Harmonic Distortion: Less than 0.5%. 30 dB Sound Quieting: Greater than 100 dB at 1 V. Video IF Bandwidth: 4.08 MHz at 6 dB down. Peak Picture Sensitivity: Greater than 100 dB. Video Cassette Recorder: 1 V composite video in/out at 75 ohms, .75 VRMS audio in/out at 600 ohms. Projector Lenses: 127 mm focal length, f 1.0/1. Projector Distance from Screen: Approximately 98 inches. Screen Dimensions: 45″ H x 60″ W. Projector Dimensions: 28″ H x 16¼″ W x 32″ D. Power Requirement: 120 VAC, 60 Hz, 150 Watts.

Save money by building it yourself

$1149.00 Kit

- The Heathkit/Thomas TO-2130 — save from assembled models
- Easy to build in six evenings — all boards are pre-wired
- Rich, beautiful sound — 12 chords, 10 voices

The Heathkit/Thomas TO-2130 Organ puts beautiful music within your budget's reach — beautiful music the entire family can play — and enjoy — right away. The TO-2130, Thomas' most popular organ, is filled with features usually found only on more expensive models.

You can build the TO-2130 and begin making music in as little as six evenings. Most circuit boards are pre-wired, and kitbuilding is a breeze.

Once you build the TO-2130, your family can be playing in no time. Quick-learn features like single-finger chords, Color-Glo keys and an easy-to-follow instruction book with color-coordinated music make playing the TO-2130 easy — even if you've never made music before. The single-finger chords free your hands to add other musical accompaniment, while the convenient Memo-Chord feature can convert a single chord key into any one of 12 major chords. The Color-Glo keys light up to identify chords and keys so anyone can begin playing immediately. An expression pedal lets you add color and dimension. The Fancy Foot pre-programmed pedal adds a distinctive professional quality to your arrangements. You can register five Solo Voices separately or in combination for brilliant musical effects, while four Accompaniment voices provide beautiful harmonic background. The Fancy Voice combines with the Solo Voices to yield even more special effects. The TO-2130 has to be heard to be believed!

The complete Playing Guide makes the TO-2130 so easy to play, even the kids can learn to make beautiful music. Find out how easy it is today. Bench included.
Kit TO-2130, Shpg. wt. 201 lbs., Motor Freight **1149.00**

Bring home the action and excitement of a pinball arcade

- SCHUSSRING™ high-action field adds arcade-like excitement
- Electronic memory keeps score
- A 2-evening kit — easy to assemble
- Save up to $100 from similar models

We put all the fast, action-packed excitement of the pinball arcade into your living room with the Brunswick® ASPEN™ Home Pinball Game. Build it yourself — in as little as two evenings — and save from similar assembled models.

Pre-assembled and tested circuit boards and playing field make the ASPEN easier and faster to assemble.

This full-sized pinball game features a SCHUSSRING™ high-action field with 18 scoring areas. Follow the regulation pinballs as they rack up points in almost no time. Double and triple scoring add to the fun, too.

A thumper bumper, two jet kickers, three rollover switches, three spin gates, three target switches and six rubber band switches keep the action moving at a feverish pace, while two independently operated flippers keep you in maximum control of each pinball. An adjustable tilt sensing mechanism stops action on the ball in play when you tilt the field.

Seven musical melodies play at the beginning and end of each game, at bonuses and when tilted.
The ASPEN's microprocessor-based electronic memory not only keeps score for up to four players during each five-ball game, but also tells you which player is shooting, which ball is in play and when the game is over, on a bright digital display.
Factory assembled circuit boards and playing field ensure years of pinball fun — and they make the ASPEN easy to assemble, with common home tools.
Kit GD-1210, Shpg. wt. 141 lbs., Motor Freight 529.95

Model Railroad Power Supply/Throttle for railroading realism

The Heathkit RP-1065 makes an HO or N-gauge layout dramatically realistic. Just operate the slide throttle control to make your engines gradually build up speed just like a real train, maintain realistic acceleration and braking at slow speeds, and stop gradually. The RP-1065 prevents stalling out when climbing grades, helps overcome train and track obstacles. Easily powers two HO or N-gauge engines — has built-in short protection with an indicator light. An ideal first kit. Operates on 120 VAC, 60 Hz. Dimensions, 4¾" H x 9½" W x 8½" D.

Kit RP-1065, Shpg. wt. 9 lbs. **79.95**
Walkaround Remote Control for RP-1065.
Kit RPA-1065-1, Shpg. wt. 3 lbs. **22.95**
Save — Buy RP-1065/RPA-1065-1 together.
RPS-1065, Shpg. wt. 19 lbs. **99.95**

Great sound for all the family

$1495.00

- One of the best organ values you can find
- One of the richest, most realistic sounding organs you can buy anywhere!
- Easy-to-build and easy-to-play

You'll be playing in no time. And enjoying every minute of it too. The TO-1860 is Heath's easy to build version of the fabulous microprocessor-based Thomas Troubadour. In fact, it's the easiest-to-build organ kit we've ever offered. Quick-learn features like Color-Glo keys, color-coordinated music, one finger chords and chord memory make it easy and a real delight to play!

Voices and effects include flute, trombone, trumpet, bassoon, diapason, clarinet, oboe, violin, mandolin and banjo. Rhythm accompaniment includes Waltz, Fox Trot, Swing, Rhythm and Blues, Rock, Polka, Samba, Bossa Nova and Rhumba. The sound system consists of a powerful, quality solid-state stereo amplifier and two 12" heavy-duty speakers.

It's fun and easy to build! Preassembled and tested modular circuit boards, wiring harnesses with built-in connectors, and no complex tuning procedures let you complete assembly in 30 hours or less. Nine preassembled and tested circuit boards comprise most of the electronics in the TO-1860. Color-coded, precut wiring harnesses plug directly into the circuit boards.

You'll have the best organ value on the market. The TO-1860 utilizes the latest "computerized" microprocessor technology to produce some of the best music you've ever heard. The cabinet has a glass music rack and comes fully-assembled of furniture-grade hardwoods. A matching padded bench with storage is included.

Kit TO-1860, Shpg. wt. 256 lbs., Motor Freight 1495.00
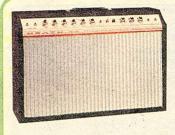**TOA-1860-1,** Demo Record & Information Packet, Postpaid 1.50

Heathkit Electronic Metronome

Ideal for music students and teachers. Maintains a steady beat so you can practice more efficiently. Adjust tempo between 40 and 210 beats per minute with a front panel control, while a rear panel control adjusts volume. A chart on the bottom of the cabinet relates the number of beats per minute to tempos in different time signatures. Handsome cherry finish birch cabinet with non-marring felt feet. Easy one-evening assembly makes it an ideal beginner kit. Uses two 9-volt batteries (not supplied).

TD-1257, Shpg. wt. 2 lbs. 19.95

High-performance, solid-state 25-watt Guitar Amp

Rugged one-piece case with handle houses a full control amplifier and speaker system with two heavy-duty 12" woofers. Two dual-input channels. Features double-spring variable reverb and tremolo with variable rate and depth, a line reverse switch to minimize hum. Two footswitches for reverb, tremolo. 19¾" H x 28" W x 9" D. 120/240 VAC.

Kit TA-16, Shpg. wt. 61 lbs. 199.95

The Heathkit PT-1500 Darkroom Timer—the most versatile darkroom timer available! NEW

$119.95

- Programmable memory holds up to nine process steps
- Convenient touch control
- Easy-to-build two-evening kit

The Heathkit PT-1500 Darkroom Timer is one of the most versatile darkroom timers anywhere! The timer is microprocessor-controlled for maximum accuracy. The PT-1500's programmable memory can hold times for up to nine process steps and an enlarger step, and auto-step sequencing loads the timer so you're ready to time the next step. If you use the optional PTA-1500-3 Auxiliary Outlet to connect the timer to an external device (such as a color drum), the Auxiliary outlet is turned on during countdowns in the Process mode. Enlarger and safelight outlets are toggled so one goes on when the other goes off (outlets for non-inductive loads only). When not in use, the PT-1500 functions as a regular clock.

Four alarm settings mark time in 1, 30 or 60 second intervals (selectable in any combination), or once at the end. The four-digit LED display times to 99 minutes, 59 seconds or 999.9 seconds. And a display switch turns off the LEDs and backlighting without affecting countdowns or memory when you need complete darkness. Litetouch™ front panel is impervious to darkroom chemicals. Control start or focus switch with optional PTA-1500-1 Foot Switch, or both start and focus switches with optional PTA-1500-2 foot switch (order below).

Kit PT-1500, Shpg. wt. 5 lbs. 119.95

Optional Single Foot Switch.
PTA-1500-1, Shpg. wt. 1 lb. 9.95

Optional Dual Foot Switch.
PTA-1500-2, Shpg. wt. 3 lbs. 24.95

Optional Auxiliary Outlet.
PTA-1500-3, Shpg. wt. 1 lb. 13.95

Introducing the finest Heathkit Stereo Receiver ever

$779⁹⁵

Silver
front
panel

125 watts of superbly defined sound plus luxury features that put you in total control
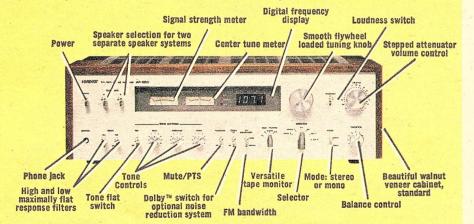
Beautiful specs, beautiful sound

- 125 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.05% TOTAL HARMONIC DISTORTION FROM 20 TO 20,000 HZ
- Hum and noise down 90 dB for backgrounds of total silence
- 3.5 μV sensitivity and 73 dB signal-to-noise ratio for maximum sensitivity and minimum distortion
- Total harmonic distortion of 0.1% (phono + amp) and 0.1% (FM + amp) assure clean, natural sound
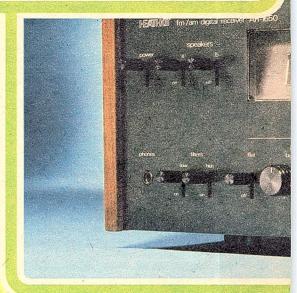
Spare-nothing design

- Digital readout displays frequencies more accurately than tuning dial
- Precision Tuning System (PTS) automatically corrects mistuning
- Stepped attenuator volume control for more accurate tracking between channels
- Convenient phono jacks permit separation of preamp and power amp for insertion of equalizer or for bi-amping
- Complete speaker and circuit protection includes speaker turn-on delay and thermal circuit breaker and fuses
- Center tune meter indicates exact center of channel for best separation and lowest distortion and noise
- 5-section tuning capacitor gives maximum rejection of unwanted signals for lower noise and cleaner sound

Signal strength meter
Digital frequency display
Loudness switch
Speaker selection for two separate speaker systems
Center tune meter
Smooth flywheel loaded tuning knob
Stepped attenuator volume control
Power

Phone Jack
Tone Controls
Mute/PTS
Versatile tape monitor
Mode: stereo or mono
Beautiful walnut veneer cabinet, standard
High and low maximally flat response filters
Tone flat switch
Dolby™ switch for optional noise reduction system
FM bandwidth
Selector
Balance control

For a variety of listening options

- Source selection includes two phonos, two auxiliary sources, FM or AM or tape monitor
- Record mode lets you record from deck 1 to deck 2 and monitor either deck or any other source
- Accommodates two separate speaker systems, so you can have music in two different areas of your home
- Phone jack lets you listen privately by headphones

New Heathkit AR-1650 Stereo Receiver

Power is more than just a number of watts. Every receiver has a particular quality in the power it delivers. That's why receivers of the same power rating, played with the same source and speakers, can sound so different. The new AR-1650 not only has all the raw power you'll ever need, it also delivers a sound quality unlike any you've ever heard before.

The designers of the AR-1650 were striving for more than just power. They were striving for precisely defined musical peaks, solid bass, fully-detailed midrange. They were striving for power infused with clarity. And the result is one of the most remarkable stereo receivers to be introduced to you in a long time, the new Heathkit AR-1650.

Remarkable signal reception

The AR-1650 Receiver has a 5-section FM tuning capacitor that gives you maximum rejection of unwanted signals for lower noise and cleaner sound. Interference is further minimized by an attenuator switch which reduces strong signals from the antenna. And a special narrow FM bandwidth switch lets you switch out unwanted signals in crowded areas for more precise reception.

Digital readout gives you a clear, handsome display of your frequency to the nearest two-tenths. It shows you exactly the frequency you're on.

Center tune meter indicates the exact center of the channel for best separation and lowest distortion and noise. Signal strength meter shows you when your signal is strongest. And a special Precision Tuning System (PTS) automatically corrects mistuning and makes it easier to find exact center tune.

Controls that let you hear your music just the way you like

The AR-1650 gives you total control to adjust the sound to your specific preference. Tone controls include separate bass, midrange, and treble for adjusting the entire frequency range. A special tone flat

switch bypasses tone controls to provide the flattest possible frequency response. High and low, maximally flat response filters with 12 dB per octave roll-off minimize signal reduction in the passband and maximize attenuation of undesired signals beyond the 3 dB frequency. They are among the best response filters you can find at any price.

Versatile source accommodation

The AR-1650 accommodates two phonos, two auxiliary sources, AM or FM, or tape monitor, for a more-than-adequate variety of source options.

The record mode lets you record from deck 1 to deck 2 while you monitor either deck or any other source. Two speaker systems can be separately driven from the AR-1650, so you can have music in two different areas of your house.

Built-in protection

Fused B+ and B− power supply lines for each channel provide protection and eliminate the need for dissipation limiters that can cause tweeter-damaging clicks and pops. Complete speaker protection includes turn-on delay and thermal circuit breakers.

Hidden features found only in the finest receivers

Like any fine equipment, the AR-1650 has features you can only feel as you operate it. The special flywheel loaded tuning knob passes smoothly through the frequency spectrum. Stepped attenuator volume control gives you more accurate tracking between channels, even at low levels.

Not all extra features are hidden. A beautiful walnut veneer cabinet is standard with every AR-1650. And you have your choice of front panels: dramatic black anodized aluminum (AR-1650B) or elegant silver (natural) anodized aluminum (AR-1650S).

Heathkit Tech Consultants assure your satisfaction

Like all Heathkit projects, the AR-1650 comes with a detailed, easy-to-follow assembly manual. And experienced service technicians are just a phone call away should you need them. You have their assurance that your AR-1650 will produce the beautiful sound it was designed to produce. To ensure performance to specifications, the amplifier, tuner and IF multiplex circuit boards are factory assembled and tested. The AR-1650 is a ten-evening kit. Order yours today. It's a beautiful receiver in appearance and performance.

Superbly designed receivers give you thrilling sound

$629⁹⁵ **70 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.08% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ**

Elegant and functional, the Heathkit AR-1515 is an exceptional stereo receiver. LED digital readout lets you tune to the frequency you want, far more accurately than dial-type tuning. Signal strength and center-channel meters help you zero in on the strongest signal and lowest FM distortion. There's even an oscilloscope output to monitor multipath distortion. The FM section features great 1.8 μV sensitivity, and the optional AD-1504 Dolby Module (below) lets you enjoy reduced noise and even greater dynamic range. Dual-gate MOSFETs in the front end and a computer-designed 9-pole filter make the AM section one of the finest in any receiver! Heath builds in an extra margin of performance to assure clean, wide-range sound, over a background of silence, without audible strain or struggle — even on the most complex musical passages. The controls are easy to reach. Preamp out/amp jacks allow an audio equalizer or noise reducer to be used. And modular design and color-coded wiring harnesses, along with a test meter to double-check your work, make the AR-1515 as easy to assemble as it is to listen to!

Kit AR-1515, Shpg. wt. 47 lbs. 629.95
Dolby FM Module, Kit AD-1504, Shpg. wt. 1 lb. 39.95

High-performance amplifier section of the AR-1515 Stereo Receiver.
Kit AA-1515, Shpg. wt. 40 lbs. 299.95

AR-1515 SPECIFICATIONS: AMPLIFIER: Frequency Response: +0, −1 dB, 8 Hz to 45 kHz; +0, −3 dB, 4 Hz to 80 kHz. **IM:** Less than 0.08%, 0.25 to 70 watts. **Damping Factor:** Greater than 60. **Input Sensitivity:** Phono 1 & 2, 2 mV; Aux., Tape & Dub, 200 mV. **Hum and Noise:** Phono (2 mV ref.), −65 dB; Aux., Tape, Dub (200 mV ref.), −80 dB. **FM Sensitivity:** 1.8 μV IHF. **Selectivity:** 100 dB IHF. **Image Rejection:** 90 dB IHF. **Stereo Separation:** 40 dB or greater at mid-frequencies. **AM Sensitivity:** 5 μV with 50-ohm direct input. **Selectivity:** 20 dB at 10 kHz.

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15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

AR-1219 SPECIFICATIONS: AMPLIFIER: Frequency Response: ±1 dB, 7 Hz to 100 kHz. **IM:** Less than 0.5%, full power; less than 0.2% at 1 W. **Damping Factor:** Greater than 30. **Input Sensitivity:** Phono, 2 mV; Tape, 190 mV. **Hum and Noise:** Phono, −60 dB; Tape, −65 dB. **FM Sensitivity:** 2μV IHF. **Selectivity:** 60 dB IHF. **Image Rejection:** 50 dB IHF. **Stereo Separation:** 40 dB typical, 35 dB minimum. **Signal-to-Noise Ratio:** 65 dB (65 dB). **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 3⅞" H x 17" W x 13" D.
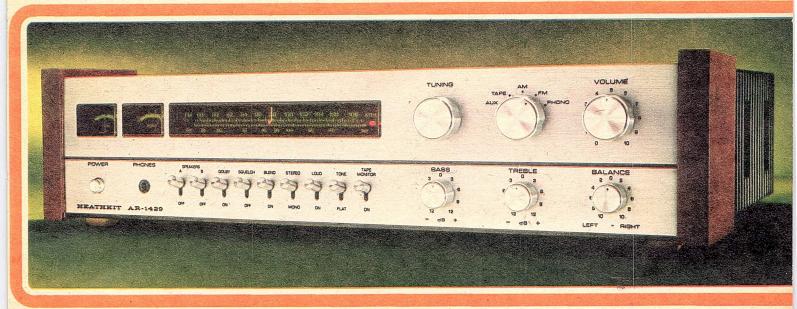
This value-priced AM/FM stereo receiver delivers clean, clear sound for your system at an affordable price

$229⁹⁵
- High-performance tuner sections
- 40 dB typical separation for spacious stereo sound

When it comes to giving you expensive performance at an economical price, the Heathkit AR-1219 is hard to beat! We've taken years of audio engineering excellence and packed them into a simple, low-cost receiver that really performs! Just 15 watts per channel; but careful engineering makes sure the AR-1219 has none of the annoying colorations and imperfections of most low-cost systems. High-performance tuners give you excellent sensitivities of 100 μV/M on AM and 2 μV on FM. And there are plenty of operating features which really add up! Controls are large enough to be adjusted easily. A headphone jack and speaker disconnect are provided for private listening. And there's a tape monitor switch for extra convenience.
Kit AR-1219, Shpg. wt. 18 lbs. 229.95

This can be the heart of a beautiful sound system for you

HEATHKIT AR-1429

$379.95

35 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.1% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

Here's a medium-power stereo receiver with specs that you'll find only on units costing a great deal more. It provides enough low-distortion power for almost any listening area. And specifications that mean true professional performance! FM sensitivity is an excellent 1.8 μV and stereo separation is 40 dB. Two 4-pole ceramic filters are used in the AM section for superb, distinct station selection. Two 8-pole ceramic filters in the FM section ensure excellent FM selectivity. An improved FM-PLL stereo demodulator provides excellent stereo reception with minimum distortion.

There are two high-level inputs, a magnetic phono input and pre-amp out/power-amp in jacks for audio accessories. A tape monitor lets you make professional style recordings. Attractive tuning scale has large, easy to read numbers. Signal and tuning meters make tuning easy and accurate. Complete controls include bass, treble and balance, FM mute and blend switches, loudness and tape-flat switches, so you can tailor the sound to your listening preference. For private listening, a headphone jack is provided on the front panel.

You can build and install the optional AD-1504 Dolby™ FM Module for the reduced noise and increased dynamic range of the Dolby FM broadcasts offered by many stations. With its superb performance and versatility, you'll find that the Heathkit AR-1429 is one of the finest medium-power receivers you can buy. Kit assembly is easy with modular circuit board construction and color-coded wiring harnesses. Like all Heath electronic kits, it comes with its own comprehensive, easy-to-follow assembly manual that takes you step-by-step from unpacking to final assembly. You'll find it hard to beat the AR-1429 without spending a lot more money. And this receiver has the looks to match the quality of its advanced electronic design. The cabinet with solid-walnut end panels (included) makes the AR-1429 a handsome addition to any decor.

Kit AR-1429, Shpg. wt. 32 lbs. 379.95
Optional Dolby FM Module, Kit AD-1504, Shpg. wt. 1 lb. 39.95

AR-1429 SPECIFICATIONS: AMPLIFIER — Frequency Response: −1 dB, 5 Hz to 45 kHz. Damping Factor: 60. Input Sensitivity: Phono, 2 mV; Aux. Tape and Tape Mon., 200 mV. Hum and Noise: Phono, −65 dB (−79 dB for 10 mV input); Aux., Tape and Tape Mon., −75 dB. Phone RIAA* Equalization: ±1 dB (30 Hz to 20 kHz). FM SECTION — Sensitivity: 1.8 μV* (10.3 dBf) usable, 4.0 μV (17 dBf @ 50 dB signal to noise). Selectivity: 65 dB. Capture Ratio*: 1.8 dB; AM Suppression*: 48 dB; Image Rejection: 90 dB*. Stereo Separation: 40 dB, typ. at 1000 Hz. Frequency Response: ±1 dB from 20 to 15,000 Hz. AM SECTION — Sensitivity: 10 μV. Selectivity: 20 dB. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 4¾″ H x 20″ W x 13½″ D (12.06 cm H x 50.8 cm W x 34.29 cm D). *Rated IHF (Institute of High Fidelity) Standards. Dolby is a trademark of Dolby Labs.

Value-priced Heathkit amplifier and tuner — good first-time kits for the beginning builder!

$129.95

Excellent sound that fits your pocketbook

15 WATTS MINIMUM RMS, INTO 8 OHMS WITH LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

The Heathkit AA-1219 Stereo Amplifier features the same excellent specifications found in the amplifier section of the AR-1219 Receiver. Delivers 15 watts, minimum RMS, per channel. Intermodulation distortion is less than 0.5% at full power, less than 0.2% at 1 watt. Phono hum and noise are −60 dB, channel separation 55 dB — which adds up to beautiful sound! Styled to match AJ-1219.
Kit AA-1219, Shpg. wt. 14 lbs. 129.95

$129.95

AM/FM Stereo Tuner with great sensitivity and PLL circuitry

The AJ-1219's pre-assembled and aligned FM front end provides 2 μV sensitivity with extremely low cross modulation and no overload, even on strong FM signals. A phase lock loop (PLL) multiplex circuit provides excellent stereo separation with minimum distortion. Stereo separation is typically 40 dB, 35 dB minimum. The AJ-1219 also delivers excellent AM performance. Pushbutton band selection, stereo light. Inputs for FM antenna, built-in AM antenna. Handsome metal case with stained walnut veneer end panels.
Kit AJ-1219, Shpg. wt. 12 lbs. 129.95

Heathkit Pro-Series gives you studio

The finest Heathkit audio system ever

The Pro-Series has specs you can hear — and the flexibility to let you hear them just the way you like. The pride of building it, the pleasure of listening to it will last a lifetime.

[1] **Heathkit AJ-1600 Pro-Series FM/AM Tuner**

[2] **Heathkit AP-1800 Pro-Series Preamplifier**

[3] **Heathkit AD-1701 Graphic Output Indicator**

[4] **Heathkit AA-1600 Pro-Series Stereo Amplifier**

Heathkit Pro-Series components are also available with optional oak-finish wood cabinets. Cabinets are listed and sold separately for each component. Order from next page.

① Heathkit AJ-1600 Pro-Series Stereo FM/AM Tuner

The new Pro-Series Tuner is Heath's finest and one of the world's finest. It's loaded with features that let you adjust to strong signals or weak signals for distortion-free, noise-free reception: Super-sensitive 1.8 μV (mono) and 3.5 μV (stereo) for reception of distant stations. Signal-to-noise ratios of 83 dB (mono) and 75 dB (stereo) are the best you'll find for the money. 0.1% harmonic distortion levels assure full, rich sound. Extra-wide band-width reduces noise and improves separation. Band-width switch lets you select narrower band for minimal interference in crowded signal areas. RF attenuator adjusts sensitivity for clear, clean signal reception. Multipath switch lets you meter multipath distortion. 75/300-ohm antenna switch maximizes front-end sensitivity. Digital readout displays frequencies more accurately than tuning dial.

Both the 5-gang FM front end and FM IF/Stereo Demodulator boards are factory assembled and tested to shorten kitbuilding time and assure optimum performance. The open chassis layout and wiring harnesses also speed assembly.

Kit AJ-1600, Shpg. wt. 25 lbs. **379.95**
AEA-1800-2, Oak-Finish Cabinet for AJ-1600.
Shpg. wt. 6 lbs. **39.95**
Kit AJA-1600-2, Dolby FM Module for AJ-1600.
Shpg. wt. 1 lb. **49.95**

AJ-1600 SPECIFICATIONS: FM Section. Frequency Response: ±0.5 dB, 20 Hz to 15 kHz. **Antenna:** 300 ohm balanced, 75 ohm unbalanced. **Selectivity:** Wide IF Bandwidth, −40 dB. Narrow IF Bandwidth: −80 dB. **Signal to Noise Ratio:** 83 dB (mono), 75 dB (stereo). **Mono Harmonic Distortion:** 0.1% @ 1 kHz. **Image Rejection:** 100 dB. **IF Rejection:** 100 dB. **Spurious Rejection:** 100 dB. **Capture Ratio:** 1.2 dB. **AM Suppression:** 60 dB. **Stereo Channel Separation:** 45 dB at 1000 Hz. **Stereo Harmonic Distortion:** 0.1% at 1 kHz. **19 kHz and 38 kHz Suppression:** 65 dB. **AM Section: Sensitivity:** External Antenna, 30 μV. Radiated, 250 μV/meter. **Selectivity:** Alternate channel, −70 dB. **Image Rejection:** 70 dB at 600 kHz. 70 dB at 1400 kHz. **GENERAL: Power Requirement:** 120 or 240 VAC, 50/60 Hz, 20 watts. **Dimensions:** 5¾″ H x 19″ W x 14″ D.

② Heathkit AP-1800 Pro-Series Stereo Preamplifier

Quality design and special features make it an extraordinary value: dual turnover tone controls permit more precise tone adjustment. Three phono inputs include one with a built-in preamp for moving coil cartridge. Selectable cartridge capacitance provides flattest frequency response for your cartridge. Phono overload indicator assures correct sensitivity. Magnetic phono preamp is designed for lowest noise with cartridge connected (rather than preamp shorted) for super-quiet performance under real working conditions. Dual turnover filters permit more subtle filtering. Built-in infra-sonic filter reduces rumble and low-frequency noise from your records. Versatile record mode lets you record from deck 1 to deck 2 or vice-versa while listening to source or tape. Independent loudness control is based on new, more accurate data. Adapter switch allows addition of noise reducer or equalizer. Precision attenuator-type volume control provides more accurate tracking between channels even at low levels. The AP-1800 switches up to 1500 watts (maximum) of power.

Kit AP-1800, Shpg. wt. 27 lbs. **379.95**
AEA-1800-2, Oak-Finish Cabinet for AP-1800.
Shpg. wt. 6 lbs. **39.95**

AP-1800 SPECIFICATIONS: Input Sensitivity: phono (moving coil), selectable 100 μV/200 μV/400 μV; phono, selectable 1 mV/2 mV/4 mV; high-level, 200 mV. **Overload*:** phono (moving coil 20 mV; phono, 200 mV; high-level, 10 V. **Hum and Noise*:** phono (moving coil −70 dB; phono, −75 dB; high-level, −95 dB. **Input Impedance:** phono (moving coil), 100 ohm; phono, 47K ohms; high-level, 50K ohms. **Frequency Response:** phono RIAA ±0.2 dB, 20 Hz-20 kHz; high-level, +0, −0.2 dB from 20 Hz to 20 kHz. **Rated output:** 1.5 V. **Total Harmonic Distortion:** phono, 0.03%; high-level, 0.02% from 20 Hz to 20 kHz. **Intermodulation IM Distortion:** 0.02% maximum. **Crosstalk:** −50 dB at 1000 Hz. **Separation:** phono, 50 dB at 1000 Hz; high-level, 50 dB at 1000 Hz. **Power Requirement:** 108-132 volts or 226-264 volts AC, 50/60 Hz. 20 watts typical. **Rear Panel AC Sockets:** 3 switched, 3 unswitched. **Dimensions:** 5.22″ H x 19″ W x 11¼″ D. *Selectivity switch at 2 mV position.

③ Heathkit AD-1701 Pro-Series Graphic Output Indicator for accurate monitoring

Accurate monitoring of peak power output is critical to avoiding overloads and speaker damage. The AD-1701 is one of the finest output indicators available at any price. Two rows of 15 LED's give visual indication of output enabling speaker balance to within a few tenths of a dB.

Six-position range switch gives you a wide range of sensitivity (see specs). Super-wide dynamic range (53 dB) covers almost any source material. Monitor peak or average values. Extremely fast response time detects transient bursts as short as ½ cycle of 20 kHz, so you're always on top of the signal.

Kit includes beautiful solid oak finish panels.

Kit AD-1701, Shpg. wt. 15 lbs. **189.95**

AD-1701 SPECIFICATIONS: PEAK MODE. Frequency Response @ 0 dB, 20 Hz to 20 kHz ±0.5 dB. **Display Accuracy at 1 kHz:** ±0.5 dB from +3 dB to −30 dB; ±1 dB from 35 dB to 50 dB. **Channel Tracking:** 0.5 dB from +3 to −30 dB; 1.0 dB from −35 to −50 dB. **Peak Detector Rise Time:** 13 μsec (50 dB rise). **Hold Time:** 50 msec. **Decay Time:** 3 msec. **Input Impedance:** 100 K ohms. **Range/Sensitivity:** Low-level, 0.1 volt; 0.32 volt; 1.0 volt. High level (8 ohms). 60 watts, 125 watts, 250 watts. **Dimensions:** 1¾″ H x 19″ W x 13″ D. 2″ H x 19¼″ W w/side panels. **Power Requirement:** 120 or 240 VAC, 50/60 Hz.

Heath-recommended cartridge for your Pro-Series system *(NEW)*

Audio-Technica AT-30E Cartridge with Dual Moving Micro-Coils™. Brings out the full capabilities of your Pro-Series system. 1.4 to 2.0 grams tracking force, radial damping system. 15 Hz-25 kHz frequency response, 25 dB separation at 1 kHz, 0.28 mV output at 5 cm/S. Requires AP-1800 or similar preamp.
ADP-1294, 1 lb. **79.95**
With turntable or changer purchase from p. 41, **59.95**

④ Heathkit AA-1600 Pro-Series Stereo Amplifier

125 WATTS, MINIMUM RMS PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.05% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

The AA-1600 reproduces the entire musical spectrum with a clarity and definition that make it an excellent choice for use with the most demanding speaker systems. Hum and noise are a full 100 dB down, so music springs from a background of total silence. Transient intermodulation distortion is less than 0.05% for clean, well-defined sound, especially at the high end of the frequency spectrum. Gold-plated binding posts provide more reliable, distortion-free connections. Fused B+ and B− power supply lines for each channel, along with rugged output devices eliminate the need for dissipation limiters which can cause tweeter-damaging clicks and pops. Complete speaker and circuit protection includes speaker turn-on delay and a thermal circuit breaker.

To assure performance to specifications, the amplifier and power supply circuit boards are supplied fully assembled, tested and adjusted. Minimal point-to-point wiring and a clean, open chassis layout make building fast and easy. This beautifully designed power amp deserves to be part of the finest stereo system.

Kit AA-1600, Shpg. wt. 51 lbs. **359.95**
AEA-1800-1, Oak-Finish Cabinet for AA-1600:
Shpg. wt. 5 lbs. **39.95**

AA-1600 SPECIFICATIONS: Frequency Response: ±1 dB, 7 Hz to 50 kHz. −3 dB, 5 Hz to 100 kHz (at 1 watt). **Intermodulation Distortion:** Less than 0.05% from 250 mW to 125 watts. **Transient Intermodulation Distortion (T.I.M.),** after. Leinonen, Otala and Curl: 0.05%. **Damping Factor:** Greater than 50. **Hum and Noise:** 100 dB below 125 watts. **Channel Separation:** 70 dB minimum. **Input Impedance:** 20K ohms. **Input Sensitivity:** 1.5 Volts. **Net Weight:** 38¼ lbs. **Dimensions:** 7⅛″ H x 19″ W x 13″ D. **Power Requirement:** 120 VAC, 60 Hz.
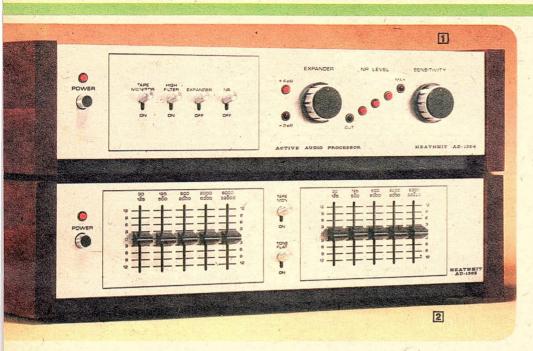
Heathkit Pro-Series Rack combines beauty and function

The AE-1705 Stereo Component Rack lets you bring together all your Pro-Series components in a way that makes them look their best and gives you easy access to all controls. Handsome walnut veneer side panels. Convenient swivel casters lock in position. Standard EIA panels in any height are compatible. Record dividers and extra shelf included. 43½″ H x 21½″ W x 18″ D.
Kit AE-1705, Shpg. wt. 74 lbs. **239.95**

Quality Heathkit components enhance your audio system

1 Active Audio Processor reduces noise while expanding the dynamic range of any program material

$199.95 Improves the sound of your hi-fi system without introducing distortion

The Heathkit AD-1304 is specifically designed to both eliminate 10 dB of high frequency noise and add 7 dB of dynamic range expansion to any program source. A separate expander section accounts for 7 dB of dynamic range expansion. Three high-frequency dynamic filters work in conjunction with a sensitivity control to discriminate between noise and music for up to 10 dB of noise reduction. Each filter operates in its own separate portion of the audio spectrum to provide the best sound while maintaining overall frequency response. For inherently noisy material such as 78-rpm recordings, AM radio or 8-track tapes, a high-filter switch on the front panel activates a 7 kHz, linear phase, 12 dB per octave filter. The AD-1304 connects between the tape output and tape monitor jacks on most units. Tape monitor facilities are provided on the back panel of the AD-1304 so that the tape monitor function is not lost.

The front panel LED's provide an easy-to-read indication of the processing. —3 dB and +4 dB LED's indicate the expander's gain. When both are of equal intensity, gain is unity. Noise reduction LED's indicate the relative amount of noise reduction. All four on indicates maximum reduction, while the green LED at lower left indicates no reduction.

The Heathkit Audio Processor boosts your dynamic range in an unobtrusive way. Your sound remains natural. Make it part of your system today.
Kit AD-1304, Shpg. wt. 12 lbs. 199.95

2 5-Band, 2-Channel Audio Equalizer gives you complete, precise tone control

$129.95 Lets you control the entire frequency spectrum for exacting system response and beautiful sound.

The AD-1305 Audio Equalizer offers complete tone control with five slide controls for each stereo channel. It is designed for use with any receiver or amplifier having a pre-amp output and power amp input, or tape monitor. Provides precise corrections without overlapping.

A center detent allows exact 0 dB setting bypassing each band; a tone flat switch bypasses the equalizer. Compensates for acoustics, differences in cartridges and speakers, even deficiencies in sources. Can also be used with tape recorders to filter old or scratchy records or broadcasts.

The AD-1305's own tape monitor lets it be used in a receiver's tape monitor circuit without losing monitor capability.

The Heathkit Audio Equalizer is a fun-to-build kit, too, even for the first-time builders. Parts mount on three simple circuit boards. Price includes case.
Kit AD-1305, Shpg. wt. 11 lbs. 129.95

AD-1305 SPECIFICATIONS: Input Impedance: 100k ohms. **Output Impedance:** 100 ohms. **Rated Output:** 1.5 V rms. **Overload:** 5 V rms. **Signal-to-Noise Ratio:** 90 dB below 1.5 V. **Total Harmonic Distortion:** 0.05% from 20 Hz to 20 kHz at 1.5 V output. **IM Distortion:** 0.05% at 1.5 volts. **Frequency Control Range:** (separate controls for each channel), 30-125 Hz, 125-500 Hz, 500-2000 Hz, 2000 Hz to 8 kHz, 8 kHz-32 kHz. **Overall Gain (flat):** Zero dB (unity gain). **Slope of Filters:** 12 dB per octave. **AC outlets:** One switched, one unswitched. **Power Requirement:** 120/240 VAC, 60/50 Hz. **Dimensions:** $4\frac{3}{16}$" H x $17\frac{1}{2}$" W x 8" D.

AD-1304 SPECIFICATIONS: Rated Input: 200 mV. **Input Impedance:** 100K ohms. **Gain:** Expander off, 0 dB (unity) ±0.5 dB. Expander on, —3 dB to +4 dB. **Frequency Response:** +0, —0.2 dB from 20 Hz to 20 kHz. **High Filter:** 7 kHz, 12 dB octave rolloff. **Noise Reduction:** 10 dB typical between 4 kHz and 15 kHz. **Hum and Noise:** —70 dB, 20 Hz to 20 kHz. **Channel Separation:** 50 dB at 1 kHz. **Output Impedance:** 500 ohms. **Input Overload:** 5 volts. **Total Harmonic Distortion:** 0.1% from 20 Hz to 20 kHz. **Power Requirement:** 120/240 VAC, 50/60 Hz, 15 watts. **Dimensions:** $4\frac{1}{2}$" H x $17\frac{1}{2}$" W x $8\frac{1}{8}$" D.

Solid-state mono amplifier — a perfect beginner's kit

3.25 WATTS, MIN. RMS, INTO 8 OHMS WITH 4.5% THD FROM 40-20,000 HZ

Use the AA-18 with a record player fitted with a ceramic cartridge, a tape player, a mono AM or FM tuner or any other signal input of at least 250 millivolts. You'll be surprised at the volume the AA-18 delivers to an efficient 8-ohm speaker, like our AS-1332 — and it's clean sound, too. Assemble in just a couple of evenings. Attractive metal case included. The AA-18 makes an ideal gift for the beginning kit builder.
Kit AA-18, Shpg. wt. 4 lbs. 27.95

Stereo Mike Mixer Console for pro-quality tapes

- Priced to fit your budget
- Just 0.5% maximum distortion

Wide frequency response and low distortion deliver clean, life-like mixing capability. Each output has its own master level control and meter. Two high-level auxiliary inputs and mike inputs can be switched off or to the left or right channels. The fourth mike input has a pan control to adjust its apparent location. Backlighted meters. For 120/240 VAC, 50/60 Hz. 60 dB gain permits use with almost any type of microphone. Case with walnut-veneer end panels. Dimensions, $5\frac{3}{16}$" H x 16" W x $9\frac{7}{8}$" D.
Kit TM-1626, Shpg. wt. 12 lbs. 159.95

Get top quality Heathkit audio at low kit prices!

The AA-1640 Stereo Amplifier — an amp for the audiophile!

$479.95
Less meters

Enough power to faithfully reproduce any type of music

200 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.1% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

The AA-1640 is for the audiophile who strives for musical reproduction free from imperfection and coloration. It features distinctive styling, excellent specifications, and a unique combination of power and features which offer the ultimate musical reproduction and maximum system protection.

The AA-1640 utilizes a unique speaker protection system which does not connect your speaker until transients have decayed, and immediately disconnects them at turn-off. It also prevents dangerous DC voltages and very low frequencies from reaching and damaging your expensive speaker system. The electronics found in the AA-1640 have but one purpose — clean, flawless reproduction of musical information. The inputs provide optimum matching and maximum preamplifier-to-power amplifier signal transfer. 8 output devices per channel and massive heat sinks develop maximum power and efficient cooling without noisy fans. Both channels are fused and current-limited for protection, should an external short occur.

The result of these efforts is an amplifier capable of reproducing quiet passages and thundering fortissimos with equal ease and definition. Frequency response is flat within −1 dB from 7-50,000 Hz, total harmonic distortion <0.1% from 250 mW to 200 W, and hum and noise inaudible.

For more precise control add optional peak-responding panel meters to your 1640. Sensitive enough to respond to a record click, the meters feature backlighted scales and calibration from −30 to +3 dB and 0.2 to 200 watts (into an 8 ohm load). Save $29.95 by purchasing the meters with your amplifier.

Kit AA-1640, Less Meters, 72 lbs., UPS only 479.95
Kit AAA-1640-1, Output meters, 3 lbs. 59.95
SAVE! Kit AAS-1640, Amp and Meters together. Shpg. wt. 86 lbs. 509.95
OTHER AA-1640 SPECIFICATIONS: Frequency Response: −1 dB, 7 Hz to 50 kHz; −3 dB, 5 Hz to 100 kHz. **Intermodulation Distortion:** less than 0.1% from 0.25 to 200 watts. **Damping Factor:** greater than 50. **Hum and Noise:** Less than 400 μV or 100 dB below full output. **Channel Separation:** 50 dB, min. **Input Impedance:** 50k ohms. **Input Sensitivity:** 1.5 V. **Dimensions:** 7¼" H x 19" W x 18" D. **Power Requirement:** 120 VAC. 50 Hz only.

Audio Control Center adds flexibility

Use the AD-1307 to meter your power amplifier

Features peak-responding meters (same as AA-1640 above) to monitor power output, terminal strips for versatile amplifier and speaker hookup, headphone jacks for conventional phones and hookup for electrostatic headphones. Has four switched and four unswitched AC outlets (with a total of 1500 watts) for flexible control of other components. The AD-1307 measures 4½" H x 17½" W x 8½" D.
Kit AD-1307, Shpg. wt. 11 lbs. 129.95

Versatile AP-1615 Stereo Preamplifier produces great sound

Ideal for use with the AA-1640 Power Amplifier

An outstanding budget-priced preamp for use with AA-1640 or other quality amplifiers. Extremely wide dynamic range with <0.05% IM distortion. Has speaker relay to prevent turn-on "thumps", sub-sonic filter, high-frequency filter, two phono inputs with excellent overload specs, aux and tuner inputs, tape monitor, headphone jack and dubbing inputs and outputs. Dimensions, 4½" H x 17½" W x 8¹⁄₁₀" D (11.4 cm H x 44.5 cm W x 20 cm D).
Kit AP-1615, Shpg. wt. 12 lbs. 139.95

Save $200 on the amazing Heathkit Modulus™ system — an outstanding component system — and an outstanding value!

$399.95

The Heathkit Modulus Tuner/Preamp is one of the finest components ever from Heath. The matching amp delivers 60 watts minimum RMS, per channel into 8 ohms at less than 0.1% total harmonic distortion from 20-20,000 Hz. Features of the AN-2016 are: digital frequency readout, signal-strength and center-channel tuning meters for tuning precision, peak-responding power output meters. A phase-locked loop stereo multiplex circuit assures wide FM stereo separation of 40 dB at 1000 Hz. Even the AM section features dual-gate MOSFET's, a nine-pole LC filter and static-shielded loop antenna for great reception. And you can add the optional modules for even more performance. Quantities limited.

Kit AN-2016A, Tuner/Preamp, 39 lbs. ....Was $599.95, now only 399.95
Kit AA-1506, Matching Amp, Shpg. wt. 25 lbs. 199.95
Kit AD-1507, CD-4 Demodulator Module, Shpg. wt. 2 lbs. 79.95
Kit AD-1504, Dolby FM Module, Shpg. wt. 1 lb. 39.95
Kit AM-1503, Full-Logic SQ Decoder Module, Shpg. wt. 2 lbs. 49.95

We give you great listening value

The ASX-1383 — with reduced diffraction to provide greater sound quality

$274⁹⁵ each

Sold in pairs only

An improvement in sound reproduction you can really hear. Now available for immediate delivery.

The ASX-1383 uses the same revolutionary design concept found in speaker systems costing $1000 and more. Now each pair is even less — a value you can't afford to pass up. The linear phase design aligns each driver's radiating surface in the same plane so the entire sound output reaches your ears at the same time, resulting in a clarity and richness of sound that you have to hear to believe. A unique curved baffle reduces diffraction to produce spaciousness and open sound, combined with outstanding stereo dispersion and imaging. The ASX-1383's drivers provide full-frequency response with excellent dynamic range. A 10-inch woofer, a 5-inch midrange and a softdome 1-inch tweeter provide the ASX-1383's excellent sound. The speaker elements are arranged for minimum line height (the entire distance from woofer voice coil to tweeter voice coil), to approximate a single-point sound source for increased dispersion and realism. Each driver is individually fused.

The ASX-1383 has been designed to look as great as it sounds too. The cabinet is select Brazilian rosewood veneer with a center-book-matched front panel for an elegant look in any decor. A charcoal black "acoustically transparent" grille cloth complements the cabinet. The ASX-1383 speaker system is sold in matched pairs only.

Kit ASX-1383, 114 lbs.
Motor Freight . . . . . . .Was 599.95, Now pair 549.90

ASX-1383 SPECIFICATIONS: Frequency Range (−10 dB): 30 Hz to 30 kHz. Frequency Response: ±3 dB, 40 Hz to 25 kHz. Impedance: 8 ohms. Recommended Amplifier Power: 10 watts minimum to 200 watts (fused for larger amplifiers). Crossover Frequencies: 750 Hz, 400 Hz. Fuses: Woofer, 1 amp slow-blow; midrange, ½-amp slow-blow; tweeter, ½-amp regular. Dimensions: 36″ H x 13½″ W x 13¼″ D (96 cm H x 34.3 cm W x 33.7 cm D).

SAVE $50⁰⁵ per pair

IN STOCK FOR IMMEDIATE DELIVERY

This 3-way floor/shelf speaker system produces truly beautiful stereo sound

$169⁹⁵ Each

Our best-selling system possesses remarkable dynamic range and clarity not found in any other 3-way system in this price range.

A truly outstanding floor/shelf speaker system, for use with the best components. The 10″ woofer provides solid, well-defined bass. The woofer to midrange crossover frequency is 500 Hz to minimize IM distortion and insure smoothness. The 4½″ midrange is isolated in its own polyester-damped subenclosure to prevent distortion caused by woofer vibrations and reflections. The 1″ dome tweeter provides excellent power handling and definition, and features horizontal dispersion of a full 120° even at 12,000 Hz. All three drivers are flush mounted, and there are no "rails" around the cabinet to limit treble dispersion. For best stereo imaging, you can position the tweeter directly above the midrange whether you position the system vertically or horizontally.— a Heath exclusive! While the AS-1373 can be used with almost any amplifier, a high-power amplifier like the AA-1640 reveals its awesome dynamic range and clarity. Has individual fusing for each driver, two high-frequency controls to match response to your listening area. Fully assembled walnut-finish veneer cabinet with deluxe, acoustically transparent foam grille, make this speaker system look as good as it sounds. With an easy-to-follow assembly manual, the AS-1373 is easy-to-build, even for first-time kitbuilders. Assembly requires just a couple of evenings per system, and when you're finished, you'll have a truly great sounding stereo pair! 8 ohms impedance.

Kit AS-1373, 68 lbs. UPS 169.95
Kit AS-1373-2, 141 lbs. UPS . . . . .pair 319.95

AS-1373 SPECIFICATIONS: Frequency Range (−10 dB): 30 Hz to 22 kHz. Frequency Response: ±3 dB, 40 Hz to 20 kHz. Impedance: 8 ohms. Recommended amplifier power: 10 watts min. to 200 watts. (fused for larger amplifiers). Crossover frequencies: 500 Hz (12 dB octave) and 3000 Hz (12 dB/octave). Fuses: Woofer, 1¼ amp Slow Blow; midrange, ¾-amp Slow-Blow, tweeter, ½-amp regular. Controls: 3 kHz shelf/flat; 10 kHz rolloff/flat. Dimensions: 26″ H x 14½″ W x 11⅞″ D, without 1¼″ grille.

Budget-priced 2-way speaker system

$59⁹⁵ Each

Buy two and save an additional $9.95 on the pair!

The AS-1332 2-way speaker system may have a low price, but it doesn't compromise your sound. It can take up to 50 watts maximum power from your amplifier and produce beautiful sound, with frequency response ±3 dB from 50 to 18,000 Hz and frequency range from 40 to 20,000 Hz. Has an 8″ woofer with a hefty 1-pound ceramic magnet and a 1¾″ phenolic ring tweeter. Tweeter level control for high-frequency adjustments.

Kit AS-1332, Shpg. wt. 29 lbs., UPS . . . .each 59.95
Kit AS-1332-2 (Pair), 63 lbs., UPS . . . . .pair 109.95

Compact bookshelf speakers

Excellent sound reproduction in a small speaker

$37⁹⁵ Pair

The Heathkit AS-1140 Speaker System gives you excellent audio from two small enclosures. The high compliance, foam suspension speakers give you smooth audio with a frequency range of 70 to 16,000 Hz. 12″ H x 7″ W x 6″ D. 8 ohms. Sold in pairs only. Great for the teenager's bedroom or the college student's dorm.

Kit AS-1140, Shpg. wt. 16 lbs. 37.95

Heathkit makes it sound great

High-power 3-way speaker system with great performance!

$329⁹⁵

Massive 15-inch slot-loaded woofer, two midranges and three dome tweeters handle up to 250 watts with rare 22 to 22,000 Hz frequency range!

The AS-1348 offers the bass power and extra-wide dynamic range to reproduce almost any kind of music realistically. Ideal for disco and rock music, where high sound pressure levels (SPL) are desired. Massive 15-inch slot-loaded woofer, two 4½" midranges and three 1" tweeters in a precision-designed cabinet. Individual protection fuses. Fully-assembled acoustic-suspension cabinet.

Kit AS-1348, Shpg. wt. 110 lbs., Motor Freight . . . . .each 329.95
Kit AS-1348-2 (Pair), Wt. 220 lbs., Motor Freight . . . . .pair 619.95

AS-1348 SPECIFICATIONS: Frequency Range (−10 dB): 22 Hz to 22 kHz. Frequency Response: ±3 dB, 28 Hz to 20 kHz. Impedance: 8 ohms nominal. Recommended Amplifier Power: 8 watts minimum to 250 watts (fused for larger amplifiers).

14 attenuation and rolloff settings assure maximum performance

Two 4½-inch midranges and three 1-inch dome tweeters

Individual protection for each speaker

[1] **Two-way Sound Column speaker system**
Sounds outstanding — no matter where you sit in the room! Reverberant speaker placement. Nominal 4 ohms impedance so most amps deliver up to TWICE their rated 8-ohm power.
Kit AS-1344, Shpg. wt. 57 lbs., UPS . . . . .each 149.95
Kit AS-1344-2, Shpg. wt. 122 lbs., UPS . . . . .pair 279.95

[2] **Low-priced three-way bookshelf speaker**
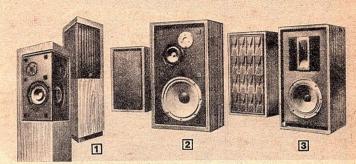Full-range system. Smooth sound, adjustable midrange and tweeter.
Kit AS-1363, Shpg. wt. 55 lbs., UPS . . . . .each 149.95
Kit AS-1363-2, Shpg. wt. 128 lbs., UPS . . . . .pair 269.95
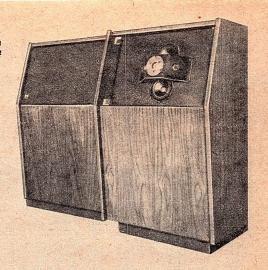
[3] **High-efficiency reflex design two-way speaker system**
Tweeter level control to custom-tailor sound. Beautiful medium sized speakers.
Kit AS-1342, Shpg. wt. 32 lbs., UPS . . . . .each 79.95
Kit AS-1342-2, Shpg. wt. 78 lbs., UPS .pair 149.95

Get the best sound with a famous-brand stereo cartridge

Quality Heath-recommended cartridges help you get more from your records. Order with a turntable (right) and save up to $80.00.

Ortofon ULM55E. Ultra-low 0.35 gm moving stylus mass protects your records. 10 Hz-30 kHz frequency response with low frequency intermodulation distortion of 0.5% at −6 dB modulation level. Lower harmonic distortion. 28 dB separation at 1 kHz. 0.7 mV output at 1 cm/S. Biradial diamond stylus. For use only with Dual changers and turntables. Mfr.'s price $110.00.
ADP-1293, 1 lb. . . . . .Our price 79.95. With any turntable or changer 59.95

Audio-Technica AT-30E Cartridge with Dual Moving Micro-Coils™. Remarkable sonic clarity and transparency. Diamond stylus is user-replaceable. 1.4 to 2.0 grams tracking force and radial damping system for excellent tracking. 15 Hz-25 kHz response, 25 dB separation at 1 kHz. Requires preamp the AP-1800 (see page 79). Mfr.'s price $125.00.
ADP-1294, 1 lb. . . . . .Our price 79.95. With any turntable or changer 59.95

Shure V-15 Type IV. Diamond stylus. 10 Hz-25 kHz response. 4.0 mV output at 5 cm/S. ¾ to 1¼ gm. tracking force. Mfr.'s price $150.00.
ADP-1259, 1 lb. . . . . .Our price 99.95. With any turntable or changer 79.95

Audio-Technica AT-14SA. Shibata stylus. Excellent 5 Hz-45 kHz response. 2.7 mV output at 5 cm/S. 25 dB separation at 1 kHz. ¾ to 1¾ grams tracking force. Mfr.'s price $150.00.
ADP-1139, 1 lb. . . . . .Our price 89.95. With any turntable or changer 69.95

Shure V-15 Type III. Diamond stylus. 10 Hz-25 kHz response. 3.5 mV output at 5 cm/sec. ¾ to 1¼ grams tracking force. Mfr.'s price $90.00.
AD-1059, 1 lb. . . . . .Our price 79.95. With any turntable or changer 59.95

Empire 2000E/III. Elliptical stylus. 20 Hz-20 kHz response. 4.5 mV output at 3.54 cm/S. ¾ to 1½ grams tracking force. Mfr.'s price $85.00.
ADP-1147, 1 lb. . . . . .Our price 59.95. With any turntable or changer 19.95

Shure M91ED. Diamond stylus. 20 Hz-20 kHz response. 5.0 mV output at 5 cm/X. ¾ to 1½ gms. tracking force. Mfr.'s price $64.95.
ADP-1062, 1 lb. . . . . .Our price 49.95. With any turntable or changer 19.95

Disckit™ by Discwasher. Keeps your records and cartridge clean and static-free. **ADP-1286, Shpg. wt. 4 lbs.** 49.95

Get the most from your records with our new line of assembled turntables!

[1] **Dual 714Q Semi-Automatic Single-Play Direct-Drive Turntable.** Dual uses a new low mass tonearm to reach a new high in performance! Total effective mass of Dual's ULM tonearm/cartridge system, with the Ortofon ULM60E cartridge, is an amazingly low 8 grams! Motor utilizes a quartz reference oscillator, PLL control circuit. The precise quartz oscillator functions with pitch control and illuminated strobe. Four-point gimbal tonearm suspension, anti-skating feature, switchable groove sensor, automatic tonearm return shutoff, front panel solenoid-operated cue control, damped in both direction. Base and dust cover included. Order cartridge at left. Mfr.'s price $479.95. **ACP-1466, 22 lbs.** . . . .**only 449.95**

Dual 622 Automatic Single-Play Direct-Drive Turntable (not shown). Automatically starts and stops, continuously repeats. Base and dust cover included. Order cartridge at left. Mfr.'s price $319.95. **ACP-1465, 19 lbs.** . . . .Our price only 299.95
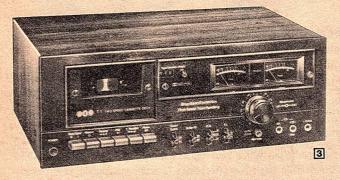
Dual 1264 Changer (not shown). Best-selling changer. Plays 1 to 6 records, continuously repeats. Base and dust cover included. Order cartridge at left. Mfr.'s price $275.00. **ACP-1464, 17 lbs.** . . . . . .only 249.95

[2] **B·I·C 80Z Changer.** Quartz crystal servo-controlled microprocessor digital drive system for better speed control. Digital pitch computer with four-character readout and stopwatch. True dynamically balanced 9" tone arm with plug-in tone arm tube for minimum mass. Oil-damped cueing with cue rate control and three-scale anti-skate adjustment. Base and dust cover included. Order cartridge at left. Mfr.'s price $239.95. **ACP-1463, 21 lbs.** . . . .Our price only 209.95

B·I·C 40Z Changer (not shown). Belt-driven changer plays 1 to 6 records. Repeat play. 9" statically-balanced tone arm. Base/dust cover included. Order cartridge at left. Mfr.'s price $149.95. **ACP-1462, 19 lbs.** . . . . . .Our price only 129.95

Unsurpassed sound and quality in cassette decks

The most advanced, best performing cassette deck we've ever offered!

☐ Two-speed deck records, plays the new metal tapes

$799.95

- High 71 dB S/N ratio with Dolby™ and metal tape
- 3-head, dual-capstan configuration
- Two-motor/full-logic solenoid control

B•I•C® brings reel-to-reel quality to cassette tapes — for the first time — in this series of Heath-recommended cassette decks! The top-of-the-line (Heathkit Model No. ATP-1484) T-4M is B•I•C's most advanced cassette deck, designed to be used with top-quality audio components like the Heathkit Pro-Series line. (You can mount the T-4M in the Pro-Series rack with the optional adapter below.)

Even at 1⅞ ips, it produces sound that compares favorably to units costing a thousand dollars and more! And its 3¾ ips speed gives high-frequency head-room that makes even inexpensive tape sound good. You can hear the difference. When you use high-quality metal particle tape, the T-4M can attain a signal-to-noise ratio of 71 dB at 3¾ ips with Dolby™ noise reduction! Frequency response at 3¾ ips is a wide 20-23,000 Hz, ±3 dB. Record calibration, microprocessor control, electronic digital readout and a state-of-the-art 45 dB peak indicating bar graph display help you maintain better control of recordings. And the T-4M lets you become more creative in recording, with mic/line mixing and Dolby™ FM copy, backed up by B•I•C's breadband electronics and a three-head/dual capstan record/play configuration.

With its impressive arsenal of performance features, the T-4M is one of the world's finest cassette tape decks! Rosewood vinyl case included.

ATP-1484, Fully Assembled, Shpg. wt. 22 lbs. 799.95

Optional Rack Mount Adapter to mount ATP-1484 in Pro-Series Rack.

ATA-1484-1, Shpg. wt. 2 lbs. 24.95

ATP-1484 SPECIFICATIONS: Tape Speeds: 1⅞ or 3¾ ips. **Wow and Flutter:** 0.03% WRMS at 3¾ ips, 0.05% WRMS at 1⅞ ips. **Fast Forward and Rewind Time:** 48 sec. with C-60 cassette. **Output:** Line, 2.0 VRMS into 10 kilohms; Headphones, .7 VRMS into 100 ohms. **Power Requirement:** 120 VAC, 50/60 Hz, 40 W. **Dimensions:** 6⁷⁄₁₆" H x 17⁵⁄₁₆" W x 10⅛" D.

☐ T-2 2-speed cassette deck with Dolby™ gives great sound

$329.95

- Loaded with features and value
- 67 dB S/N ratio with Dolby at 3¾ ips

B•I•C's T-2 Two-Speed Cassette Deck (Heathkit Model No. ATP-1482) offers many of the features of the T-4, without metal tape capability. You still get great sound, with 25-19,000 Hz frequency response at 1⅞ ips and a 67 dB S/N ratio with Dolby™ NR at 3¾ ips. Tach feedback DC servo motor. Case included.

ATP-1482, Fully Assembled, Shpg. wt. 15 lbs. 329.95

☐ Budget-priced doesn't mean budget performance!

$279.95

- Wide frequency response — 30 to 20,000 Hz at 3¾ ips
- Excellent 66 dB S/N ratio with Dolby at 3¾ ips

The T-1 Cassette Deck (Heathkit Model No. ATP-1481) may be our lowest-priced two-speed cassette deck from B•I•C — but you'll be tested to tell by listening! You'll find many of the features of our higher-priced B•I•C decks — Dolby™ NR, high-speed tape handling and six-position equalization and bias. Case included.

ATP-1481, Fully Assembled, Shpg. wt. 14 lbs. 279.95

Save with super-discount prices on Heath-recommended, top quality Scotch® Master™ Series cassette tapes

Now you can save up to $4.00 on quality Deluxe Scotch® Master™ Series cassette tapes. Whether you're looking for expanded dynamic range with normal bias; extra high- and low-frequency response with chrome (CrO_2) bias; or increased low- high-frequency sensitivity with ferri-chrome (FeCR) bias — there's a Master Series cassette for you! Each cassette is designed for long life and mechanical reliability. These tapes will capture more of your system's range of recording capability . . . and save you money, too. Order more than one package to increase your savings.

Stock No.	Master Series	Type of Bias	Playing Time	Shpg. Wt.	Package of 4 Was	Package of 4 Now
ADP-1904	MI-C90	Normal	90 min.	1 lb.	15.95	11.95
ADP-2604	MII-C60	CrO_2	60 min.	1 lb.	13.95	10.95
ADP-2904	MII-C90	CrO_2	90 min.	1 lb.	17.95	13.95
ADP-3604	MIII-C60	FeCr	60 min.	1 lb.	13.95	11.49
ADP-3904	MIII-C90	FeCr	90 min.	1 lb.	17.95	14.49

Your car never sounded so good!

High-power Clarion digital AM/FM stereo/cassette unit

$399⁹⁵

- Performance equaling fine home units
- SASC circuitry to enhance FM reception
- 30 W RMS power amplifier

LSI tuning circuit and PLL provide accurate FM tuning and stability. The PE-958A's SASC Control improves FM reception by drastically eliminating static. With Dolby™ NR and metal tape capability, the cassette section performs as well as high-quality home decks. With powerful GA-302E 30W RMS amplifier.

CCP-1393, Assembled, 12 lbs., Mfr.'s price $519.90 .... 399.95

CCP-1393 SPECIFICATIONS: FM Sensitivity: 1.5 μV at 75 ohms. FM Selectivity: 80 dB (±400 Hz). FM S/N Ratio: 55 dB. FM Frequency Response: 30 Hz-15 kHz (±3 dB). Tape Frequency Response: 40 Hz-15 kHz (±3 dB). Tape Wow and Flutter: .13% WRMS. Tape S/N Ratio: 62 dB with Dolby™ NR, CRO₂ EQ and metal tape. AM Sensitivity: 26 dB. Dimensions: 6.0 cm H x 18 cm W x 14 cm D. For amp specifications see CAP-1392 below.

B·I·C C1 Two-Speed Auto Cassette Deck

Complements the B·I·C 2-speed home decks on the opposite page. Metal tape capability. Delivers 12 W RMS per channel, with 40 Hz-20 kHz frequency response, less than 1% THD and .08% WRMS wow and flutter at 3¾ ips. 58 dB S/N ratio, 10 dB Dolby™ NR. Fast forward and rewind. Full controls. Preamp output jacks. Underdash mount. Mfr.'s sugg. ret. price. $229.95.
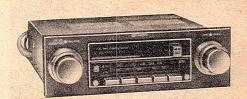
CTP-1541, Assembled, Shpg. wt. 6 lbs. 219.95

Clarion stereo radio/tape combinations

PE-751B (CRP-1391, shown) 10 W RMS per channel. SASC improves FM. Dolby™ NR. Add GA-302E (CAP-1392) amp for more power. For better sound, add EE-115 (CEP-1394) EQ to GA-302E. PE-666B (CRP-1267) similar to CRP-1391, without SASC, Dolby™ NR or metal tape capability.

CRP-1391, 8 lbs., Mfr.'s price $389.95 ..... 299.95
Dimensions: 50 mm H x 180 mm W x 160 mm D.
CRP-1267, 6 lbs., Mfr.'s price $252.95 ..... 169.95
Clarion PE-623B, similar to CRP-1267 except 8-track.
CRP-1266, 5 lbs., Mfr.'s price $163.95 ..... 119.95

Quality accessories make car stereo sound even better

[1] **Clarion GA-302E 30 W RMS Power Amplifier.** Delivers 30 RMS, 24 W per channel minimum into 4 ohms with less than 1 percent total harmonic distortion (THD) from 40 to 20,000 Hz. 80 dB signal-to-noise ratio. Use with new PE-751B (CRP-1391) AM/FM stereo/cassette unit above for ultra-high power at low distortion. Fully assembled. Dimensions, 125 mm H x 140 mm W x 100 mm D.
CAP-1392, 6 lbs., Mfr.'s price $99.95 .... 79.95

Clarion Equalizers. Perfect and compatible companions for your auto stereo system. Custom mix highs and lows to adjust music to your personal taste. EE-115 (CEP-1394), for PE-958A and PE-751B units only. Clarion 100EQB-3 (CAP-1264), which fits most tuners and tape players such as CRP-1266 and CRP-1267 above, includes 15 W RMS

power booster. Assembled.
[2] **CEP-1394**, 3 lbs., Mfr.'s price $54.95 .... 44.95
Dimensions: 50 mm H x 140 mm W x 30 mm D.
[3] **CAP-1264**, 4 lbs., Mfr.'s price $124.95
Was $99.95, Cut $10.00 .... NOW ONLY 89.95

[4] **Clarion RKA-055 High-Power Fader Control.** This great accessory gives you additional flexibility in customizing your sound when installing four speakers with high-power amplifiers. The high-power fader allows you to control front-to-rear sound balance to suit your tastes and vehicle acoustics. Designed for use with CCP-1393/CAP-1392 systems, can also be used with most high-power amps. Fully assembled. Save from manufacturer's list price.
CDP-1395, Shpg. wt. 1 lb. 19.95

SAVE $10⁰⁰

Clarion Speaker Systems speak highly of your music
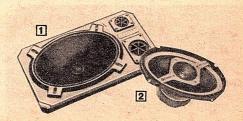
[1] **New 3-Way Rear Deck Mount Speaker Systems** fit without custom installation. 6" x 9" woofer, 20-oz. magnet. 30W/ch. max. Mfr.'s sug. price $174.50.
CSP-1396 (Clarion SK-103), Shpg. wt. 15 lbs. 129.95
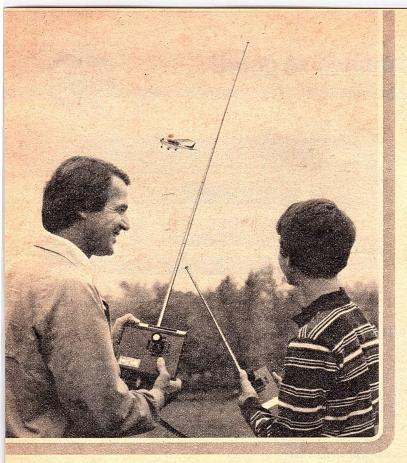
Same as above, except 4" x 10" to fit compacts, door mounts. Mfr.'s suggested price $156.50.
CSP-1397 (Clarion SK-102), Shpg. wt. 12 lbs. 119.95

[2] **Two-Way Car Stereo Speaker** The Clarion SK-89 Speaker brings great sound to your vehicle at a low price — and Heath makes it even better by offering a discount from the manufacturer's $67.95 suggested list price. 6" x 9" woofer and 3" center-mounted tweeter. Installs flush in rear deck, includes handsome grill.
CSP-1261, Shpg. wt. 10 lbs. 59.95

Buy any receiver above — and any pair of speakers above — and take 5% off the full price (excluding sales tax, shipping and handling charges).

Heathkit Pack-17™ R/C lets you

[4] 8-Channel Single-Stick Transmitter. Stick control of 3 channels, throttle with trim and aux., plus landing gear switch & 2 additional channels. Includes your choice of one plug-in frequency module.
Kit GDA-1205-S, Shpg. wt. 6 lbs. **159.95**

GDA-1205 AND GDA-1919-1 SERIES SPECIFICATIONS: TRANS. — RF Frequency: crystal controlled, all bands. Frequency stability: within ±.005% on 27 MHz; within ±.002% on 53 MHz; 72 MHz. Temp. Range: 0 to 160°F. RF Output Circuit: pi network. RF Input Power: at least 500 mW. Modulation: on-off carrier keying. Approx. Current Drain: 100 mA on all bands. Controls: GDA-1205, 8 channels (4 with trim), on/off, trainer button; GDA-505, 5 channels (4 with trim), on/off switch, trainer button. Power Supply: Internal 9.6V 500 mAH Ni-Cad. battery. Rechargeable simultaneously with receiver battery at 35 to 40 mA from 120 volt power line. Dimensions: 7" H x 7" W x 2" D. Net Weight: 2½ lbs., with battery. GDA-1205-2 SPECIFICATIONS: RECEIVER — Local Oscillator Operating Frequency: crystal-controlled, all bands. Temperature Range: 0 to +160°F. Sensitivity: 5 μV or better. Selectivity: 6 dB down at ±4 kHz; 30 dB down at ±9 kHz. Current Drain: 10 mA. Intermediate Frequency: 453 kHz. Power Supply: 4.8 V battery pack (GDA-1205-3). Controls: On/off switch. Dimensions: ⅝" H x 1¾" W x 1¾" D. Net Weight: 2 ozs.

[5] 3-Channel Pack-17™. Has the convenience and versatility of plug-in frequency change and it's the only 3-channel system we know of that includes rechargeable batteries and an external charger so you fly with full power and uncompromised performance. Has 2-axis stick assembly, easy to handle transmitter with convenient strap for one-hand operation. An optional conversion pack lets you go 4-channel by adding another channel to the stick. All three stick channels have trim control, the 4th channel is controlled by a thumb tab. Compatible with all Heathkit servos. Specify frequency when ordering (see specs below).
Kit GDA-1405-1, 3-ch. transmitter with 1 Module. Shpg. wt. 5 lbs. **84.95**
Kit GDA-1405-3, 4-ch. conversion. Shpg. wt. 1 lb. **12.95**

GDA-1405-1 SPECIFICATIONS: TRANSMITTER — RF Carrier Frequency: One frequency, crystal-controlled on 27 MHz or 72 MHz bands. Operating Temperature: 0°-160°F. Controls: 3 channels (two with trim); ON-OFF switch. Optional fourth channel. Power Supply: Internal 9.6V, 500 mA hours, nickel-cadmium battery. Rechargeable simultaneously with receiver battery at 35-40 mA from external charger. Frequencies Available: 27 MHz (11 meters) — 26.995, 26.045, 27.095, 27.145 & 27.195. 53 MHz (6 meters) — 53.100, 53.200, 53.300, 53.400, 53.500. 72 MHz (4 meters) for R/C planes only — 72.080, 72.240, 72.400, 75.640. (All Models — 72.160, 72.320, 72.960.) Dimensions: 9½" H x 3¹¹⁄₁₆" W x 2¼" D (24 cm H x 9.5 cm W x 5.7 cm D).

Advanced Radio Control book. Tells how to use R/C to make model airplanes, boats and other R/C devices perform complicated maneuvers. An ideal introduction to rocket and robot automation, proportional control servomechanisms.
EDP-158 ....**4.95**
Radio Control Handbook. Explains the basics of radio control, covering most conventional control systems. This book is a must for the RCer's library.
EDP-159 ....**9.95**

Uncompromised performance, unbeatable value — Heathkit Pack-17™ R/C won't let you down
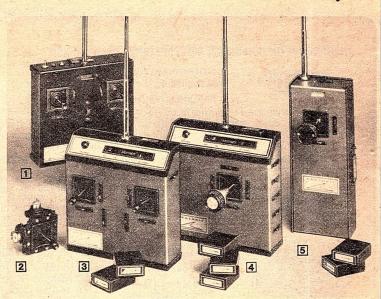
Heathkit radio control gear is designed by engineers who care about R/C. That's why we were the first to use ceramic filters to eliminate drift — the first to put 8 channels in a single, versatile unit — the first to give you instant plug-in frequency change. And that's why we're first in quality and value. Compare Heathkit R/C with top-of-the-line assembled models, and you'll see that we're the winning way to fly!

Latest design 5- and 8-channel transmitters feature open gimbals

[1] Check this exciting 5-Channel Dual Open-Gimbal Stick R/C Transmitter. You won't find the value, reliability and performance of this transmitter in any other unit in this price range! Here's dual-stick control of four R/C channels (one with ratchet) plus a switch-activated auxiliary channel for retracts or other switched functions. Open-gimbal sticks provide smoothness and control you'll appreciate. Plug-in module capability and step-by-step instruction manual for easy kitbuilding and do-it-yourself service make this your best R/C value. Transmitter includes your choice of one plug-in frequency module. Order your GDA-1919-1 transmitter as part of a complete system from next page.
Kit GDA-1919-1, Shpg. wt. 4 lbs. **119.95**

[2] Open-Gimbal Stick Conversion Kit. Owners of Heathkit GD-1205-D and GD-505-D R/C transmitters can now get the convenience and control of open-gimbal stick R/C with this easy to install conversion kit. GD-1419 includes two sticks.
Kit GD-1419, Shpg. wt. 1 lb. **37.95**

[3] 8-Channel Dual Open-Gimbal R/C Transmitter. Heathkit top-of-the-line R/C transmitter now gives you Open-Gimbal stick convenience too! Two control sticks and a retractable landing gear switch provide control of five servos. Three auxiliary controls allow control of three more servos. Four trim tabs allow you to make fine adjustments to the first four channels, without changing stick position. It's one of the most versatile R/C transmitters you'll find anywhere! Easy kit assembly. Includes your choice of one plug-in frequency module from 17 frequencies on opposite page. Powered by rechargeable 9.6 volt nickel-cadmium battery pack, recharger included. Order your 8-Channel R/C Transmitter as part of a complete system from the next page.
Kit GDA-1205-OG, Shpg. wt. 5 lbs. **139.95**

Heathkit Pack-17™ R/C Systems save where it counts —

in the pocketbook, not in performance. Heathkit R/C out-performs top-of-the-line assembled systems. And when you buy a Heathkit Pack-17™ R/C System, you save twice — when you buy and when you build!

Sub-Miniature Servos

Miniature Servos

Receiver with Module

Your choice of transmitter

Battery Pack

Battery Charger

Cessna 172 flight pack expands your R/C horizons

You can even buy this beautiful, maneuverable Cessna 172 model airplane with your Heathkit Pack-17™ R/C System to make it complete. It has a 48″ wingspan and comes ready to assemble. All you need to add is fuel!

Includes Fox .25 engine, fuel tank and line, machined aluminum mount, wheels, prop and hardware.

Convenient plug-in modules let you add more frequencies

NOTE: Amateur Radio License required for operation on 53 MHz band. Class C License required for operation on 27 MHz and 72 MHz bands. When ordering specify exact frequency desired (see list below).

Transmit Module, 1 lb . . . . .19.95   Receive Module, 1 lb 13.95

FREQUENCIES AVAILABLE (MHz): 26.95, 27.045, 27.095, 27.145, 27.195, 53.1, 53.2, 53.3, 53.4, 53.5, 72.08, 72.16, 72.24, 72.32, 72.40, 72.96, 75.640 MHz. (When ordering, specify transmit or receive.)

SPECIAL 5-MODULE OFFER — SAVE $39.55!
5 Transmit and 5 Receive Modules of your choice. 2 lbs. . . . Only $129.95

High-quality Heathkit Servos, Receivers and Batteries

SERVO COMPARISON CHART	Miniature GDA-1205-4	Sub-Miniature GDA-1205-5	Hi-Torque GDA-1205-8
Idle Current (max.)	15 mA	15 mA	20 mA
No Load Current	80 mA	80 mA	150 mA
Stall Current (nom.)	450 mA	450 mA	1000 mA
Thrust	4 lb.	4 lb.	6 lb.
Travel Time	0.5 sec.	0.5 sec.	0.4 sec.
Rotary Travel	90°	90°	90° or 180°
Dimensions (HxWxL*)	1⅝x1¹⁵⁄₁₆x2⁹⁄₃₂″	1¹¹⁄₁₆x¾x2⁹⁄₃₂″	1⅝x1¹⁵⁄₁₆x2⁹⁄₃₂″
Net Weight	1.75 oz.	1.25 oz.	1.75 oz.

All servos: **Power Requirement:** 4.8 VDC. **Position Accuracy:** 1%. **Output:** 1 rotary arm, 1 rotary wheel. **Input Signal:** Pulse, 1-2 msec, 4V P-P. **Temperature Range:** 0° to 160° F. **Backlash:** <0.002″. *H includes outputs, L includes mtg. ears.

Kit GDA-1205-5, Sub-Min. Servo. Shpg. wt. 1 lb. 26.95
Kit GDA-1205-4, Miniature Servo. Shpg. wt. 1 lb. 26.95
Kit GDA-1205-8, Hi-Torque Servo. Shpg. wt. 1 lb. 29.95
Kit GDA-1205-2, Receiver with 1 Frequency Module. 1 lb. 59.95
Kit GDA-1205-3, Receiver Battery Pack. 1 lb. 11.95
Trainer Link Accessory. Lets you hook up two 1205 transmitters for flight instruction. GDA-1205-6, Shpg. wt. 1 lb. . .10.95

Thumb Tach® measures rpm without physical connection to engine. 0-5000 & 0-25,000 ranges. Ideal for needle valve adjustment, selection of glow plugs, etc. **Kit GD-69,** wt. 1 lb. 27.95

R/C Battery Monitor. Expanded scale voltmeter checks capacity (under load) of batteries. Includes meter, connector for all Heathkit battery packs, clips and case. **Kit GD-1188,** Shpg. wt. 1 lb. 14.95

SAVE $99.70! Complete system outfits your model for R/C

5-Channel Open-Gimbal Stick System: Includes the GDA-1919-1 open gimbal stick transmitter described on the opposite page, plus one plug-in frequency module, receiver and one plug-in frequency module, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, this system would cost you up to $299.65. Save nearly $100 when you get the complete 5-Channel Open-Gimbal Stick System!
GDS-1919, Shpg. wt. 9 lbs. 199.95

SAVE $114.70 on the Cessna 172 and a complete R/C system

Same as system GDS-1919 (above) plus the Cessna Skyhawk Flight Pack.
RPS-1919, Shpg. wt. 30 lbs. 259.90

Save when you get one of these complete R/C systems

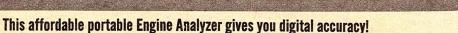Buy a complete Heathkit R/C System and pay much less than if you purchased the components separately.

The following systems include transmitter and one frequency module, receiver and one frequency module, receiver battery pack and batteries, and four servos (choose miniature, subminiature or both) — except GDS-1405-1 and GDS-1405-2 include 2 servos.

8-Channel Dual Open-Gimbal Stick System. If purchased separately up to $319.65. **GDS-1205-OG,** Shpg. wt. 11 lbs. 249.95
8-Channel Single Stick. If purchased separately, up to $339.65.
GDS-1205-S, Shpg. wt. 11 lbs. 264.95
3-Channel System. (Includes two servos.) If purchased separately, $212.75.
GDS-1405-1, with miniature servos, wt. 8 lbs. 179.95
GDS-1405-2, with subminiature servos, wt. 8 lbs. 179.95
RP-1172, Cessna 172 Skyhawk Flight Pack only, Shpg. wt. 8 lbs. . .74.95
SAVE $84.70! Same as system GDS-1205-OG plus Cessna 172 Flight Pack.
RPS-1205-OG, Shpg. wt. 32 lbs. 309.90
SAVE $89.70! Same as system GDS-1205-S plus Cessna 172 Flight Pack.
RPS-1205-S, Shpg. wt. 32 lbs. .324.90
SAVE $45.80! Same as system GDS-1405-1 plus Cessna 172 Flight Pack.
RPS-1405-2, Shpg. wt. 29 lbs. .239.90
SAVE $49.80! Same as system GDS-1405-1 plus Cessna 172 Flight Pack.
RPS-1405-3, Shpg. wt. 29 lbs. .262.85

BONUS: Receive free the R/C Handbook with the purchase of any system above. Specify GDA-1205-7 on your order.

Save energy—tune up with Heathkit auto instruments

NEW

Only Heath puts so much versatility, performance and value into a self-powered portable digital engine analyzer! The CM-1550 (with optional CMA-1550-1 Shunt Accessory shown above) can even measure strong starting, battery charging and battery discharging currents safely.

Kit CM-1550, Shpg. wt. 5 lbs. 94.95

400 Amp Shunt Accessory for CM-1550 Analyzer. Required to use 400 amp range of CM-1550.

CMA-1550-1, Shpg. wt. 1 lb. 13.95

This affordable portable Engine Analyzer gives you digital accuracy!

$94⁹⁵

- Measures dwell, RPMs, DC voltage, resistance and direct current
- Battery-operated — fewer clumsy wires
- Large, clear liquid crystal display

You will like this new CM-1550 Engine Analyzer — a versatile, accurate and portable digital engine analyzer at a price to fit your budget! You get all these critical tune-up measurements: Dwell for 4 through 8-cylinder engines, accurate to ±0.2%; RPMs to 10,000 in two ranges, ±0.1%; DC Voltage, in two ranges, to 200 Volts, ±1.5%; and Resistance to 2.0 megohms, ±1.5%, in three ranges.

With the optional CMA-1550-1 Shunt Accessory, the CM-1550 is one of the few analyzers in its price range that can measure starting current and battery

charge and discharge current — up to 400 amps with ±5% accuracy! And the CM-1550 has a large liquid crystal display that's easy to read.

Power is supplied by a 9-volt battery (not included), which means there are fewer clumsy wires under the hood. The CM-1550's inductive pickup for tach readings is simply attached to any spark plug wire with easy-to-use alligator clips. Thermal insulation on the wiring resists melting or burning under high heat conditions.

Assembles easily in two or three evenings, with just one circuit board. The CM-1550 can be easily calibrated from internal references — no special tools are required. For any spark-ignited engine, whether standard or electronic ignition. Convenient, light plastic carrying case included.

CM-1550 SPECIFICATIONS: Dwell Meter: Four dwell scales: 4 cylinders, 0° to 90°, ±0.2%; 5 cylinders, 0° to 72°, ±0.2%; 6 cylinders, 0° to 60°, ±0.2%; 8 cylinders, 0° to 45°, ±0.2%. **Tachometer:** Two RPM ranges: 0.00 to 10.0 (x1000), ±0.1% of indication; 0 to 1999, ±10 RPM. **DC Voltmeter:** Two voltage scales: 0 to 19.99 V, ±1.5%; 0 to 199.9 V, ±1.5%. **Ohmmeter:** Three resistance scales: 0 to 199.9 ohms; 0 to 19.99 kilohms; 0 to 1.999 megohms, all ±1.5%. **Direct Current:** Two current ranges: 0 to 19.99 amperes, ±3% (standard); 0 to 400 amperes, ±5% (requires optional CMA-1550-1 Shunt Accessory). **Operating Temperatures:** 0° to 140°F (−18° to +60°C). **Power Requirement:** 9-volt NEDA 1604 battery. **Battery Life:** up to 200 hours with alkaline battery. **Lo-Bat** indicated in last 20% of battery life. **Overrange Indicator:** Most significant "1" lighted, all other digits blank. **Dimensions:** 3½" H x 12½" W x 8" D.

Extra-versatile Timing Light with advance meter and built-in tachometer

$64⁹⁵

Press the trigger to get a super-bright timing flash and a meter indication of distributor advance in degrees. Take your finger off the trigger to measure engine RPMs. Measures mech. or vacuum advance to 60° from 1500 to 4500 RPM, engine speed to 4500 RPM. Works with all ignition systems. 12 VDC.

Kit CI-1096, Shpg. wt. 4 lbs. . . .64.95

Use this Timing Light in bright daylight!

$29⁹⁵

Recommended for GM HEI and other systems. Features handy inductive pickup that clips directly around #1 sparkplug wire. Super-bright xenon flash lamp can be easily seen, even outdoors. Useful light range up to 2 ft. in daylight. Polarity protected. Powered by your car's battery or a separate 12 VDC supply. With all cables, pickup, clips. 6½" H x 2" W x 10" L.

Budget-priced, yet powerful

Kit CI-1040, Shpg. wt. 3 lbs. 29.95

Save $10 on this self-powered Timing Light and Tachometer

$49⁹⁵

The first self-powered, professional-quality timing light — no need for battery connections or clumsy wires! Just connect to #1 spark plug. Bright timing light. Tach measures to 6000 RPM. Includes rechargeable battery and battery pack. For 12 VDC ignition systems. 7¼" H x 2⅝" W x 11½" L.

Kit CI-1098, 4 lbs.
Was $59.95, Now 49.95

46

Save more with Heathkit professional-quality auto test equipment

Professional-quality Ignition Analyzer assures you of precision auto tuneup
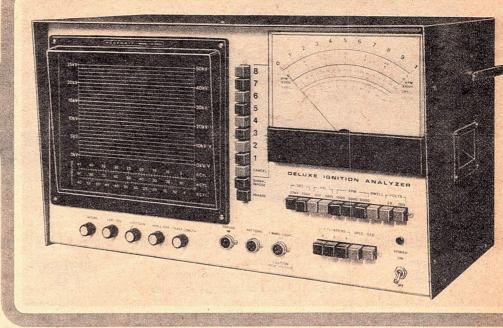
$449.95

- Pushbutton for individual or multiple cylinders
- Parade and superimpose
- Cylinder shorting for balance

The Heath CO-2600 provides the most asked for features in an ignition analyzer of this quality. Rock steady parade patterns are made possible by the latest design in inductive pickup circuitry and switch selection of number of cylinders — four, six or eight. Dwell, RPM and voltage measurements are indicated on the big eight-inch meter.

Has two voltage ranges — 0-2 V for corroded connections and points measurements and 0-20 V for battery condition and general distribution checks.

Cylinder selection buttons can be pushed in multiple numbers so that banks of cylinders can be shorted for carburetor balance and for display of one or more cylinders. Both parade and super-imposed displays of primary or secondary waveforms at two different amplitudes are available on the 12" diagonal CRT.

Rugged high-temperature oil and gas resistant neoprene cables provide easy, positive connections to engine. Includes adaptor for GM HEI ignition systems. For use with 4, 6, or 8-cylinder (4-cycle) or 2-rotor Wankel engines and standard, transistorized or C-D ignition systems. With Heath's excellent manuals to guide you, you'll find assembly and operation of the CO-2600 to be a simple matter.

Kit CO-2600, Shpg. wt. 83 lbs. 449.95

COA-2600-2, Alternator Test Adaptor. 1 lb. 9.95

Kit COA-2600-4, Timing Light/Advance Meter
Plugs directly into CO-2600 and provides a bright flash that can be seen even in daylight. Has built-in advance meter. All cables included.
Shpg. wt. 3 lbs. 49.95

Kit COA-2500-1, Economy Timing Light.
Shpg. wt. 2 lbs. 19.95

WOA-2500-1, Assembled Timing Light.
Shpg. wt. 3 lbs. 29.95

CO-2600 SPECIFICATIONS: For Use With: Standard, transistorized, or C-D ignition systems. 4, 6, or 8-cylinder (4-cycle), or 2-rotor Wankel engines. **Signal Pickup:** Direct for primary, inductive for parade trigger, and capacitive for secondary. **Tachometer and Voltmeter Accuracy:** ±3% of full scale on any range. **Scope Vertical Expand:** Min. 2 to 1. **Operating Temp. Range:** 32°F to 104°F. **Tachometer:** 1000 rmp, 3000 rpm, 6000 rmp. **Voltmeter:** 2 or 20 VDC. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 12⅞" H x 25¼" W x 14⅛" D.

Deluxe Scope Cart
Keeps CO-2600 at ideal viewing angle for easy reading.
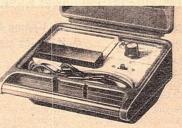COA-2600-3, Shpg. wt. 25 lbs. **39.95**

Handy universal Tune-up Meter for most small engines

Tests volts, ohms, dwell, continuity on 1-4 cylinder, 2 & 4 cycle engines

Ideal for garden tractor, lawn mower, motorcycle, snowmobile, outboard motors, small cars — all small engines including Briggs and Stratton. Tests volts, ohms, dwell and continuity on 1 to 4 cylinder, 2 and 4 cycle engines. Built-in tach and snap-on pickup for easy setup and use.

Kit CM-2045, Shpg. wt. 4 lbs. 49.95

CM-2045 SPECIFICATIONS: Voltmeter: 0-20 V DC. **Ohmmeter:** 0-100 kΩ (10 kΩ center scale). **Tachometer:** 0-3000 rpm, 0-15000 rpm. **Dwell Meter:** 1 cyl. 90°-360°; 2 cyl. 40°-180°; 3 cyl. 30°-120°; 4 cyl. 20°-90°. **Dimensions:** 9⅛" H x 9⅜" W x 5¼" D.

Economy three-in-one Tune-up Meter

Just two leads to connect to the engine; draws its power from car battery

Combines a distributor cam dwell meter, an electronic tachometer and a DC voltmeter in a single, compact unit. Can be used with both 6 and 12-volt electrical systems with positive or negative ground, and with solid-state and high-energy ignition systems. Complete with leads, instructions, case.

Kit CM-1073, Shpg. wt. 5 lbs. 28.95

CM-1073 SPECIFICATIONS: Dwell meter: Three dwell scales: 8 cyl., 10-45 degrees; 4 cyl., 20-90 degrees; 6 cyl. & 3 cyl. x 2, 25-60 degrees. **Tachometer:** Two RPM ranges; Low range — 0-1500 RPM; High range — 0-2500 RPM. **Dimensions:** 4¼" H x 8½" W x 7¼" D.

Get the best from your car with Heathkit auto instruments

Versatile Heathkit Ignition Analyzer makes car tune-ups easier

$169⁹⁵
- Easier-to-use than meter analyzers
- Built-in rpm indicator for easy measurements
- Designed for four, six or eight-cylinder engines

Locate ignition troubles the scientific way. The Heathkit CO-1015 Ignition Analyzer detects shorted plugs, bad ignition points, defective wiring, worn distributor parts, incorrect dwell angle, plus coil or condenser defects and transistor or capacitive discharge circuitry problems. Can be used with any standard, transistorized or capacitive discharge ignition system on four, six or eight-cylinder engines with distributors. You select one of four different patterns — primary or secondary, in either parade or superimposed display. For detailed analysis, the horizontal sweep can be expanded 10 to 1, vertical sweep 2 to 1. Includes adapter for use with General Motors High Energy Ignition systems. Operation handbook (supplied) illustrates typical auto engine waveforms.

Kit CO-1015, Shpg. wt. 22 lbs. 169.95
Kit COA-1015-1, 12-Volt Inverter. Lets you operate CO-1015 from your car's 12-volt lighter socket. Shpg. wt. 3 lbs. 34.95

CO-1015 SPECIFICATIONS: Power Requirement: 120/240 VAC, 60/50 Hz, 16 W. **RPM Range:** 400-5000. **Cylinders:** 3, 4, 6 or 8. **Connection Cables:** 12' pick-up clamp; ground and secondary clip leads extend 2' beyond pick-up clamp. **Tachometer:** 0-1000 RPM, 0-5000 RPM ±5% of full scale. **Dimensions:** 7" H x 10½" W x 17½" D.

Low-cost professional-grade Engine Analyzer tests batteries, too

$79⁹⁵
- Works with any voltage, any 3, 4, 6 or 8-cylinder engine
- With all leads and accessories for complete tuneups
- Accuracy is excellent — ±3% for all settings

This professional-grade instrument tests conventional, magneto, transistorized, and most capacitive discharge ignition systems — both positive and negative ground, any voltage, on any 3, 4, 6 or 8-cylinder engine. Also tests storage battery, generator or alternator, voltage regulator, starter, distributor, ignition circuit (points, condenser and coil), accessories and all the electrical wiring. The large 6" meter is color-coded for easy reading. No need to recalibrate between functions. Easy to connect and use. Needs 3 "C" batteries (not supplied).

Kit CM-1050, Shpg. wt. 8 lbs. 79.95

CM-1050 SPECIFICATIONS: Voltmeter Ranges: 0-3.2 V DC, 0-32 V DC, ±3% of full scale. **Ohm-meter:** Two ranges: R x 1 (100 Ω center scale), R x 100 (10 Ω center scale), ±3° arc. **Tachometer:** Two ranges: 0-1200 rpm, 0-6000 rpm, ±3% of full scale. **Dwell Meter:** Two ranges: 0-45° (on 0-60° scale). 0-60°, ±3% of full scale. **Amperes:** −5 to +90 amperes DC, ±3% of full scale. **Spark Output:** 0-50. **Point Resistance:** Good/Bad. **Alternator:** Good/Bad. **Condenser:** 0.22 μF, 10%. **Accuracy:** ±3% of full scale. **Cables:** Two 8" test cables. One 2' alligator/alligator lead. One 2' alligator/push-on connector lead. One calibration cable. **Accessories:** 90-amp shunt. 0.25 Ω resistor assembly. One alligator clip. Two #10 solder lugs. **Dimensions:** 7½" H x 10½" W x 8¾" D.

Give your battery instant starting power when the mercury plunges!

☐1 15-Amp Automatic Battery Charger has safety turn-off, battery boost

$79⁹⁵ Charges 12-V car batteries at 15-amp rate; provides a 50-amp boost charge to charge dead batteries fast!

Don't let a dead battery make you miss important work and social commitments when freezing temperatures hit. The GP-1044's front panel meter monitors the battery and indicates charge rate, current and full charge, or if boost charge is required. When the battery is fully charged, the GP-1044 turns itself off. Complete circuit breaker protection prevents damage to charger or battery. For use on positive or negative ground batteries. All solid-state. Comes with all cables for fast, easy hookup. 6⅛" H x 11½" W x 7¾" D. For 110-130 VAC, 60 Hz.
Kit GP-1044, Shpg. wt. 22 lbs. 79.95
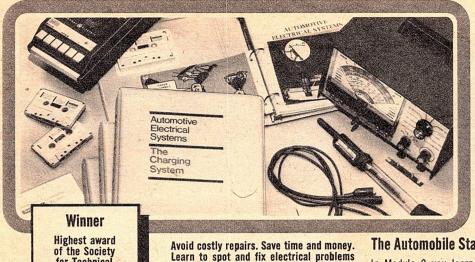
☐2 10-Amp Automatic Battery Charger for quick starts in winter weather

$49⁹⁵ Won't overcharge and ruin your battery, even if you leave it hooked up to this charger for long periods of time!

Old Man Winter can't kill your battery with a freezing blast when you have the Heathkit 10-amp Automatic Battery Charger. It charges 12-volt car batteries at 10-amp rate, turns off automatically when battery is fully charged. A front panel meter monitors battery to indicate rate of charge and full charge. Easy to use — just connect the battery cables (included) to your car battery terminals and plug charger into AC outlet. Safety circuit prevents sparking until proper hookup. 5½" H x 9" W x 6⅜" D. For 110-130 VAC, 60 Hz.
Kit GP-21, Shpg. wt. 13 lbs. 49.95

Learn about your car's electrical system the audio-visual way

- Our Automotive Electrical Systems Self-Learning Program shows you how to do it yourself—and save
- Proven audio-visual instruction techniques make it easier than ever before to learn about automotive electrical systems
- Your learning experience is more effective, because you see and hear each step
- Use the Automotive Electrical Self-Learning Program to prepare for the NIASE Electrical Systems Exam
- Your money refunded if you're not completely satisfied — or if you fail the NIASE Electrical Examination

Winner

Highest award of the Society for Technical Communicators

Avoid costly repairs. Save time and money. Learn to spot and fix electrical problems yourself with the new Heath Automotive Electrical Self-Learning Program. Keep your car running more reliably and reduce expensive "in-shop" repairs. (Photo shows Program plus optional Engine Analyzer, Timing Light and Tape Recorder).

This 4-module program uses audio-visual methods to give you a complete understanding of the principles of automotive electrical systems, as well as a practical guide to diagnosing and correcting common problems. You'll learn how to care for your battery, how to test each part in your starting and charging systems, how to trace the circuitry throughout your car and repair all lights and accessories. You'll learn how to read schematics, how to use a multimeter, and how to perform preventive maintenance that keeps your electrical system in peak condition and assures you of miles of trouble-free driving.

It's easy! This award-winning program uses proven audio-visual techniques for easy, thorough learning. Clear, color visuals are combined with audio cassette tapes, so you see and hear each step. This is reinforced by a programmed instruction written text and test questions and by optional experiments and projects which you perform on your own car.

It's fast! This program is carefully organized and professionally designed for efficient learning. You move at your own pace, as fast or as slow as you choose. For experienced mechanics, the Program is a valuable reference work.

Money-back guarantee. If you're not completely satisfied with your Automotive Electrical Self-Learning Program...or if, after completion of the program, you fail to pass the electrical systems exam given by the National Institute for Automotive Servicing Excellence...we will refund the purchase price.

After completing the Heathkit Automotive Electrical Systems Program (Modules 1 through 4), you should have a thorough understanding of your car's electrical system, along with the experience and confidence to correct almost any auto electrical system problem that arises.

Upon passing the final exam with a grade of 70% or better, you will receive 4.0 Continuing Education Units — a nationally-recognized way of acknowledging participation in non-credit adult education — and a Certificate of Achievement. The Heathkit Automotive Electrical Systems Program includes all four modules, cassette holder, binder, clip leads, parts for experiments and hydrometer. (See the optional Engine Analyzers on page 48).

Electrical Principles of the Automobile:

In Module 1 you learn basic electrical principles, including an understanding of positive and negative charges, the relationship between voltage, current and resistance (Ohm's Law), and series and parallel circuits. You'll learn to:

- Apply the principles of electricity to your car's electrical system.
- Diagnose and troubleshoot basic circuit problems.
- Measure headlamp current and battery leakage.
- Use a VOM to measure voltage, current and resistance.

The Automobile Starting System:

In Module 2 you learn about the major components of your starting system, how they work to start your car, how to keep your starting system in good working order, and how to correct common starting problems. You'll learn to:

- Troubleshoot starter relay, neutral safety switch, starter solenoid and starter motor.
- Describe relationship between battery voltage and starter motor current.
- Measure starter current draw.
- Test voltage drop on your car's starter motor.
- Repair or replace components in your starting system.
- Locate open or short circuits.
- Avoid cold weather starting problems.

The Automobile Charging System:

In Module 3 you learn about the components of your car's charging system, including the alternator and regulator. You'll learn to:

- Understand the functions of the components of your car's alternator.
- Energize the alternator field.
- Compare advantages of the alternator vs. the DC generator.
- Identify and test the condition of your car's voltage regulator.
- Examine the voltage regulator and alternator for correct operation.
- Trace the charging system's wiring.
- Measure charging voltage.
- Take necessary safety precautions when working on your charging system.
- Use an engine analyzer (such as the CM-1050 on page 48) to test engines.
- Repair or replace components.

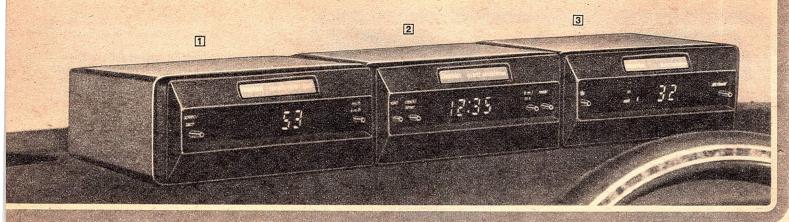## Body and Accessory Electrical Circuits:

In Module 4 you learn about the circuitry that powers the lights and accessories of your car. You'll learn to:

- Read wiring diagrams and apply them to your own car.
- Test and correct circuitry defects.
- Isolate shorts in a lighting circuit.
- Test and repair seat belt warning system, hazard and turn-signals, and power window malfunctions.
- Determine if charging system is adequate to add accessories.
- Use correct replacement wires.
- Identify common problems of thermo-electrical and electro-magnetic gauge systems.
- Test and replace the instrument voltage regulator of your car.

The Automotive Electrical Program consists of Modules 1 through 4, cassette holder, binders, clip leads, electrical parts for experiments and a professional hydrometer. (Order optional auto test instruments on pages 46 through 48).

EAC-1, Shpg. wt. 23 lbs. 79.95

NOTE: This Program prepares you to pass the National Institute for Automotive Servicing Excellence professional auto mechanic certification exam on auto electrical systems. Contact NIASE. 1825 K Street, NW, Washington, DC 20006 for information on the exam.

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Digital readout car accessories from Heath

[1] Tachometer/Speedometer shows speed and engine rpm

As low as
$44⁹⁵

Now get instant digital readout of your car's speed and engine RPM as you drive. Styled to match CI-1525

As a digital readout speedometer, the CI-1265 instantly and continuously monitors your car's speed. The continuous digital readout provides a better degree of accuracy than most conventional speedometers and maintains its accuracy over its entire speed range. Push a front panel button, and the CI-1265 instantly switches to show your engine rpm. The CI-1265 is sensitive enough to indicate changes in speed as little as 1 mph (or 1 kmph) and rpm variations of 100. A single calibration control on either mph or kmph ranges automatically calibrates the other range, so conversion between English and metric speed units is unnecessary. Features an automatic dimming circuit which adjusts display to ambient light, front panel speed/tach switches. For use with any 4, 6, or 8-cylinder, 4-cycle engine with spark ignition. With hardware and mounting bracket for installation in or on your car's dash. For 12 VDC negative ground. Easy kit assembly.

Kit CI-1265-1, For cars without CS-2048 Cruise Control. Shpg. wt. 3 lbs. **54.95**
Kit CI-1265-2, For cars with CS-2048 Cruise Control. Shpg. wt. 3 lbs. **44.95**

[2] Car clock/timer with digital quartz precision

$39⁹⁵

Clock for accurate time in your car
Timer keeps track of driving time

Display turns off with the car ignition to preserve battery power, but clock continues to keep accurate time. It's compact enough for easy mounting on or under the dash of your car, boat, camper or motorcycle — anywhere a source of 12 VDC negative ground is available (not approved for aircraft use). Display dims automatically for easy and safe viewing at night.

GC-1415 Digital Quartz Clock/Timer displays the time to the minute in easy-to-read fluorescent digits, also includes switch-selectable timing ranges for

0-24 hours for timing trips in hours and minutes and 0-10 minutes for timing minutes and seconds for use as a stopwatch. Timer accumulates for 24 hours and can be stopped to allow actual driving time to be calculated without including stops. Clock and timer functions can be switched back and forth without affecting accuracy of either function. 1.80" H x 4.71" W x 3.12" D.

It's a handsome addition to any car, as well as a useful driving aid.

Kit GC-1415, Shpg. wt. 2 lbs. . . . . **Now 39.95**
GC-1406 Digital Readout Quartz Clock (Not Shown). Same as GC-1415, but does not include timing functions.
Kit GC-1406, Shpg. wt. 1 lb. **27.95**

[3] Car Thermometer shows inside and outside temperatures

$89⁹⁵

Easy-to-read digital display shows two temperatures — interior and outside temperatures for vehicle or boat

It's ideal for R-Vs, campers, motor homes, any 12-volt vehicle. Two temperature sensors, one for outside your vehicle and one for inside, give you outside and inside temperatures. Outside sensor can alert you to frozen roads. You can even use it in your boat with a sensor placed outside at water level to indicate the surface temperature of the water. The 2½-digit readout indicates temperatures from $-20°F$ to $140°F$ ($-30°C$ to $+60°C$). Special IC sensors and a dual-slope A/D converter combine to give you a readout accuracy of $\pm 3\%$. A button automatically changes the readout from Fahrenheit to Celsius, and you can alternate inside or outside readings or hold either one. Has automatic brightness adjustment for easy reading in any ambient light.

Includes inside and outside temperature sensors, each with 9½-ft. cable. Sensors are submersible. Easy mounting with sticky-backed tape or with special gimbal bracket, both included. You also get solid-state design for long, reliable performance. 3.12" H x 4.71" W x 3.12" D. For 12 VDC negative ground.

Kit CI-1525, Shpg. wt. 2 lbs. **89.95**

Now! Theft security for all vehicles with this burglar alarm

Protects with ultrasonic sound. Detects any interior motion and sounds your vehicle's horn. Designed for use on cars, trucks, vans, motor homes, cruisers, etc. Very easy assembly, installation. No running wire throughout car.

Kit GD-1558, Shpg. wt. 2 lbs. **49.95**
Kit GDA-1558-1, Horn Relay Kit, Shpg. wt. 1 lb. **2.95**

Windshield Wiper Delay prevents "slapping" in rain or mist

For most single and 2-speed electric wiper systems. Most GMs, AMCs, Fords (except '72-'76 Montego, Torino & '74-'76 Cougar), Chryslers (except with motor reversing parking system). Note: Auto wiring diagrams not supplied for this unit.

Kit CH-1068, Shpg. wt. 2 lbs. **15.95**

Handy Heathkit Cab-to-Camper Intercom

Convenient Intercom has 3-position switch on Master to select "Standby," "Monitor" or "Talk" modes. Remote can initiate calls. Has "Radio" position to bring music into camper from cab radio. Requires 12 V, 250 mA power source.

Kit GD-160, Master, Remote & Cable. Wt. 5 lbs. **39.95**
GDA-160-1, Accessory Plug. For quick disconnect. 1 lb. **4.95**

The Heathkit Car Security System protects your car

Sounds horn if thieves break in. **Kit GD-1157,** Wt. 3 lbs. **29.95**
Kit GDA-1157-1, Optional Siren Accessory, 2 lbs. **19.95**
GDS-1157, GD-1157 and siren together. 12 lbs.
If purchased separately . . . .**$49.90, System price 39.95**
Kit GDA-1157-2, Relay for cars without horn relay. 1 lb. . .**2.95**
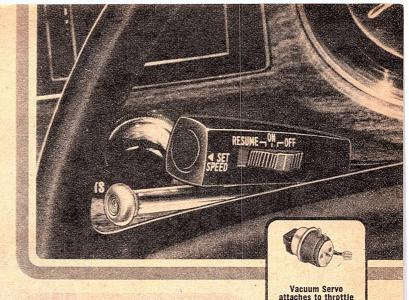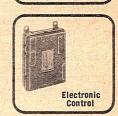
Heathkit auto accessories

$79.95 Heath/Dana Speed Control increases gas mileage and reduces driving fatigue on long car trips

Just accelerate to your desired speed, set the control and the CS-2048 auto matically maintains your desired speed uphill or downhill, around curves and on straightaways! You can take your foot off the gas pedal, relax, and pay attention to the road! A touch of the brake pedal releases control and a resume control lets you slow down or pass cars without affecting the set speed, a set button lets you set a new cruise speed as you desire. The CS-2048 can be used with both automatic and manual transmission, with most domestic cars, trucks and light vans. It can be used with many foreign cars with appropriate adaptor kits sold below. For 12 VDC negative ground only.

CS-2048, Shpg. wt. 6 lbs. 79.95
CSA-2048-1, Kit contains magnet pair, adhesive and filament tape along with in- structions for front-wheel-drive cars or for parts replacement use. For parts replace- ment or front wheel drive cars not specifically covered in kits below.
Shpg. wt. 1 lb. 5.95

CSA-2048-2, Contains servo cable, throttle linkage adaptor hardware and magnet pair for '73-75 Honda Civic, '75-'77 Honda CVCC and '77 Honda Accord.
Shpg. wt. 2 lbs. 14.95

CSA-2048-3, Kit contains servo cable, throttle linkage adaptor hardware and vacuum tee for '75-'77 Toyota Corollas. Shpg. wt. 2 lbs. 14.95

CSA-2048-4, Kit contains throttle linkage adaptor hardware and vacuum tee for '73-'75 Toyota Corona (2000 cc), '75-'78 Toyota Corona (2189 cc), and '73-'74 Toyota Celica. '75-'78 Toyota Celica, '74-'75 Toyota Crown, '75-'76 Toyota Mark II, Toyota Pickup, '74-'77 Datsun 610/710, '77 Datsun 810, '74-'77 Datsun 280Z.
Shpg. wt. 1 lb. 4.95

CSA-2048-5, Kit contains servo cable, magnet pair, throttle linkage, adaptor hardware, vacuum tee and engagement switch mounting post for the following fuel-injected cars: '76-'77 Volkswagen Dasher, '76-'77 Volkswagen Scirroco, '76 Volkswagen Rabbit, '76-'77 Audi Fox. Shpg. wt. 2 lbs. 14.95

CSA-2048-6, Kit contains servo cable, magnet pair, and throttle linkage adaptor hardware for '75-'77 Datsun B210, '77 Datsun F10. Shpg. wt. 2 lbs. 14.95

IMPORTANT INSTALLATION NOTE: While the CS-2048 Heath/Dana Speed Control comes fully assembled and tested, and includes a fully detailed manual, installation does require a certain amount of mechanical proficiency. Mod- ifications must be made to the throttle linkage of your car, and work must be performed under the vehicle in order to install the speed trans- ducer unit. If you are uncertain of your abilities, you may wish to employ the services of a quali- fied auto mechanic to install your Speed Control.

Vacuum Servo attaches to throttle

Electronic Control

The Heathkit Capacitive-Discharge Ignition System saves you gas

- Improves mileage to save you money
- Get longer life from plugs and points

Get up to 50,000 miles between tune- ups on cars, trucks, inboards, I/O & outboard marine engines with 12V battery/distributor/coil negative ground systems. Delivers a larger, more precisely-controlled spark to the plugs to better burn the air-fuel mixture. Reduces problems caused by point bounce and wear. External override button switches to conventional system. Con- struction and installation are quick and easy. 3⅛" H x 3¾" W x 6" D.
Kit CP-1060. Shpg. wt. 3 lbs. 39.95

Need a tune-up? The Heathkit Exhaust Analyzer will tell you

The CI-1080 monitors your car's exhaust for minimum air pollution and maximum effi- ciency by measuring thermal conductivity of the exhaust gases. Shows the air-fuel ratio, combustion efficiency and the per- centage of carbon monoxide in the exhaust. Ideal for checking a car which must meet auto manufacturer's specifications or environmental agency require- ments for exhaust emissions. The CI-1080 is contained in a rugged carry- ing case with a foldaway handle and includes all necessary cables and tubing for easy connection. Easy-to-build kit.
Kit CI-1080. Shpg. wt. 6 lbs. 79.95

Concealed horn

Exterior horn

Get the Emergency Siren/PA for your volunteer unit

If your community's volunteer emergency unit or rescue squad is trying to make its dollars stretch as far as possible, the GD-18 Emergency Siren/PA will meet your requirements for high quality, convenient features and low cost. It's a 55-watt siren with automatic or manual "wail", a 20-watt Public Address System to amplify your voice, or a radio call alert when you're away from your vehicle. Has push-to-talk noise-cancelling microphone for clear voice reproduction. Select your choice of high output speakers—either con- cealed or exposed horn. Concealed speaker requires 4½" x 4½" x 13" behind grille. Note: please check standards for mobile sirens in your area.

Kit GD-18, Shpg. wt. 6 lbs. 69.95
Assembled WD-5130, Siren/PA amp, Wt. 6 lbs. 129.95
Assembled GDA-18-1, Exterior horn, Wt. 10 lbs. 79.95
Kit GDA-18-2, Concealed horn, Wt. 10 lbs. 79.95
Assembled WDA-5130-2, Concealed horn, Wt. 10 lbs..............99.95

SAVE On these Siren/PA systems! If purchased separately, 149.90
$19.95 GD-18A (Kit GD-18 and Exterior Horn) Shpg. wt. 21 lbs. 129.95
GD-18B (Kit GD-18 and Concealed Horn) Shpg. wt. 21 lbs. ..129.95

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EASY ORDERING INFORMATION

By Phone:

Use the Heath Hotline
- Anytime, day or night
- 7 days a week

(616) 982-3411

It's faster, more convenient and your order will be handled promptly. Our order desk is open 24 hours a day, 7 days a week. Be sure to have your order written and all information at hand when calling.

Terms:

- **Heath Revolving Charge Plan.** No money down. Up to two years to pay. Two convenient monthly payment plans available. Down payments are encouraged to reduce your monthly payments and finance charges. Follow instructions on the reverse side of order form. Be sure to sign charge agreement.
- **Commercial Accounts.** Net 30-day terms available to well-rated companies.
- **Educational Accounts.** Net 30-day terms available to Patterson listed educational institutions. Authorized purchase order is required.
- **Note:** All credit orders subject to Heath Credit approval.

Quantity Orders:

- **Commercial, Educational, and Industrial Sales:** For quotations on 10 or more of any Heath product, kit or wired, write or phone Marketing Services Department, **616-982-3454.**
- **Contract Sales.** For orders of 250 or more of any Heath product, kit or wired, write or phone Contract Sales Department, **616-982-3519.** Private labeling, custom packaging, or design modifications can be made to meet your specific needs.
- **Special Educational Product Discount:** For quantities of 100 or more, including special versions of educational products to fit a particular teaching situation, contact Contract Sales Department, **616-982-3519.**
- **Note:** Quantity discounts apply to single models only — not combination orders, special offers, or systems.
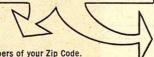
By Mail:

- Use order form on opposite page.
- Always write your name exactly the same way each time you order.
- Give your address with full details including zip code and daytime phone.
- Fill out your order completely with quantity, model number, description, price, and shipping weight exactly as shown in the catalog. Enter shipping and handling charges for each item from the rate chart.

SPECIAL SHIPPING AND HANDLING

- **Motor Freight Items** — Items indicated Motor Freight exceed weight or size limitations of UPS or Parcel Post. Examples are TV's, organs, some speaker systems, garage door mechanisms, antennas, etc. These are shipped with freight charges collect. If one item on your order is Motor Freight, all items will be shipped Motor Freight. Consult your local carrier for charges and type of service available before ordering.
- **APO/FPO Shipments** — Use the following Zones to estimate costs — West Coast, Zone 8; East Coast, Zone 5; Miami, Zone 6. PAL (Airlift Military) carries packages by air transport for a fee of $1 per package plus postage. Parcel must weigh less than 30 lbs. and not exceed 60" in length and girth.
- **SAM:** Parcel must weigh less than 15 lbs. and not exceed 60" in length and girth. Be sure to check with your local postmaster for exceptions to certain APO or FPO numbers.

USE THESE HANDY CHARTS TO FIGURE SHIPPING AND HANDLING CHARGES

HEATH PHONE DIRECTORY FOR ASSISTANCE AND INFORMATION

Replacement Parts Orders:
Please have Heath part no.
available when you call 616-982-3571
International Sales 616-982-3512
General Office (non-order calls) .. 616-982-3200
Computer Sales and Information 616-982-3285

Technical Assistance:
- R/C, Audio, Electronic Organs 616-982-3310
- Amateur Radio 616-982-3296
- Test Equipment, Weather Instruments, Home Clocks 616-982-3315
- Television 616-982-3307
- Aircraft, Appliances, Automotive, Marine, Scanners' Security, General Products 616-982-3496
- Computers 616-982-3309

8:00 A.M. to 12:00 P.M. and 1:00 P.M. to 4:30 P.M., EST, Weekdays only

Rate Chart:
Heath Shipping and Handling Charges, mailable items only. See special shipping & handling information for motor freight items.

Shpg. Wt.	Zone 1 & 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Blue Label Air Service Charge Zone A	Blue Label Air Service Charge Zone B
1	$1.20	$1.27	$1.39	$1.58	$1.64	$1.72	$1.83	$1.53	$1.59
2	1.35	1.39	1.56	1.72	1.84	1.98	2.22	2.14	2.25
3	1.45	1.53	1.73	1.86	2.04	2.24	2.61	2.74	2.91
4	1.56	1.65	1.82	2.00	2.23	2.50	3.00	3.35	3.57
5	1.66	1.77	1.92	2.14	2.43	2.77	3.39	3.95	4.23
6	1.71	1.84	2.01	2.28	2.62	3.03	3.78	4.56	4.90
7	1.76	1.90	2.11	2.41	2.82	3.29	4.17	5.17	5.56
8	1.80	1.97	2.20	2.55	3.02	3.56	4.56	5.77	6.22
9	1.85	2.03	2.29	2.69	3.21	3.82	4.95	6.38	6.88
10	1.89	2.10	2.39	2.83	3.41	4.08	5.34	6.98	7.54
11	1.94	2.17	2.50	3.00	3.65	4.42	5.73	7.59	8.21
12	1.98	2.22	2.56	3.09	3.77	4.57	6.12	8.20	8.87
13	2.02	2.27	2.63	3.17	3.89	4.72	6.41	8.80	9.53
14	2.05	2.33	2.75	3.25	3.99	4.86	6.62	9.41	10.19
15	2.12	2.43	2.88	3.38	4.10	4.99	6.80	10.01	10.85
16	2.20	2.54	3.02	3.54	4.31	5.13	6.98	10.62	11.52
17	2.28	2.64	3.15	3.71	4.53	5.39	7.15	11.23	12.18
18	2.36	2.74	3.28	3.87	4.74	5.66	7.31	11.83	12.84
19	2.44	2.84	3.41	4.04	4.95	5.92	7.47	12.44	13.50
20	2.52	2.94	3.54	4.20	5.16	6.18	7.62	13.04	14.16
21	2.61	3.05	3.68	4.37	5.38	6.45	7.76	13.65	14.83
22	2.69	3.15	3.81	4.53	5.59	6.71	7.99	14.26	15.49
23	2.77	3.25	3.94	4.70	5.80	6.98	8.31	14.86	16.15
24	2.85	3.35	4.07	4.86	6.02	7.24	8.63	15.47	16.81
25	2.93	3.45	4.20	5.03	6.23	7.50	8.95	16.08	17.47
26	3.01	3.56	4.34	5.19	6.44	7.77	9.28	16.68	18.14
27	3.09	3.66	4.47	5.36	6.66	8.03	9.60	17.29	18.80
28	3.17	3.76	4.60	5.52	6.87	8.30	9.92	17.89	19.46
29	3.25	3.86	4.73	5.69	7.08	8.56	10.24	18.50	20.12
30	3.33	3.96	4.86	5.85	7.29	8.82	10.56	19.10	20.78
31	3.42	4.07	5.00	6.02	7.51	9.09	10.89	19.71	21.45
32	3.50	4.17	5.13	6.18	7.72	9.35	11.21	20.32	22.11
33	3.58	4.27	5.26	6.35	7.93	9.62	11.53	20.92	22.77
34	3.66	4.37	5.39	6.51	8.15	9.88	11.85	21.53	23.43
35	3.74	4.47	5.52	6.68	8.36	10.14	12.17	22.13	24.09
36	3.82	4.58	5.66	6.84	8.57	10.41	12.50	22.74	24.76
37	3.90	4.68	5.79	7.01	8.79	10.67	12.82	23.35	25.42
38	3.98	4.78	5.92	7.17	9.00	10.94	13.14	23.95	26.08
39	4.06	4.88	6.05	7.34	9.21	11.20	13.46	24.56	26.74
40	4.14	4.98	6.18	7.50	9.42	11.46	13.78	25.16	27.40
41	4.23	5.09	6.32	7.67	9.64	11.73	14.11	25.77	28.07
42	4.31	5.19	6.45	7.83	9.85	11.99	14.43	26.38	28.73
43	4.39	5.29	6.58	8.00	10.06	12.26	14.75	26.98	29.39
44	4.47	5.39	6.71	8.16	10.28	12.52	15.07	27.59	30.05
45	4.55	5.49	6.84	8.33	10.49	12.78	15.39	28.19	30.71
46	4.63	5.60	6.98	8.49	10.70	13.05	15.72	28.80	31.38
47	4.71	5.70	7.11	8.66	10.92	13.31	16.04	29.41	32.04
48	4.79	5.80	7.24	8.82	11.13	13.58	16.36	30.01	32.70
49	4.87	5.90	7.37	8.99	11.34	13.84	16.68	30.62	33.36
50	4.95	6.00	7.50	9.15	11.55	14.10	17.00	31.22	34.02
Add'l lbs.	.08 lb.	.10 lb.	.13 lb.	.16 lb.	.21 lb.	.26 lb.	.32 lb.	.60 lb.	.66 lb.

Your shipping and handling charges are indicated in the zone column across from the shipping weight.

Note: Blue Label Service Area Zone A covers: CT, ME, MA, NH, NJ, RI and VT. **Zone B** covers: AZ, CA, FL, ID, MT, NV, NM, OR, UT, WA, WY.

IMPORTANT: 1. Shipping weights listed for model numbers shipped in more than one carton have been adjusted to provide correct postage.

Zone Chart:
Your zone is indicated by the first three numbers of your Zip Code.

Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone
006-009	8	260-261	3	363-369	5	476-477	3	598-599	7	820-822	5
010-069	4	262-278	3	370-386	5	478	4			823-826	5
070-089	4	279	3	387	5	479-489	2	600-609	2	827	5
090-099	4	280-283	4	388	5	490-491	5	610-619	3	828-832	6
		284-285	5	389-397	5	492	4	620-623	2	833	7
100-108	4	286-293	4			493-495	3	624-628	3	834	6
109	5	294-295	5	400-406	3	496-499	3	629-668	4	835-838	7
110-119	5	296-297	4	407-409	4			669-679	5	840-847	6
120-123	4	298-299	5	410-412	3	500-516	4	680-687	4	850-864	7
124-126	5			413-422	4	520-524	3	688-693	5	865-884	6
127-128	4	300-303	4	423	4	525	4			890-898	7
129	5	304	5	424-426	4	526-528	3	700-722	5		
130-152	4	305-307	5	427-432	5	530-534	2	723-727	4	900-921	8
153	3	308-329	5	433-436	2	535-539	5	728-768	5	922-928	7
154-160	4	330-334	6	437-457	5	540	4	769	6	930-934	8
161	3	335-338	5	458	4	541-546	2	770-778	5	935	7
162-163	4	339	6	460-462	3	547-548	5	779-789	6	936-960	8
164-165	3	340	5	463-464	2	549	4	790-792	5	961	7
166-199	4	350-352	4	465-466	1	550-566	4	793-799	6	962-976	8
		354	4	467-469	3	567	5			977-979	7
200-232	4	355-359	3	470-472	4	570-572	4	800-803	5	980-987	8
233-237	5	360-361	5	473	2	573-588	5	804-805	4	988-994	8
238-259	4	362	3	474-475	3	590-597	6	808-816	6	995-999	8

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Heathkit® Heath Company
Benton Harbor, MI 49022

ORDER FORM/Agreement

848- 407

❶ BILLING ADDRESS (Print or write plainly — always use same name)

Name_____

Apt./Lot/Bldg._____

Street Address_____

City_____ State_____ Zip_____

❷ SHIPPING ADDRESS (If different from above)

Name_____

Apt./Lot/Bldg._____

Street Address_____

City_____ State_____ Zip_____

❸ ADDRESS CHANGED SINCE LAST ORDER?
Please indicate old address.

Name_____

Apt./Lot/Bldg._____

Street Address_____

City_____ State_____ Zip_____

IMPORTANT ORDERING INFORMATION

1. Please use separate sheet to order parts, manuals or for any correspondence.
2. All prices are net FOB Benton Harbor, Michigan and apply to the U.S., APO and FPO areas only.
3. Prices and specifications are subject to change without notice.

SPECIAL BOOK ORDERING INFORMATION — There is a $10 MINIMUM for a book-only purchase. No minimum if books are ordered with kits. Do not calculate postage on books, simply add 50¢ for each book to the postage columns on the order blank.

❹ METHOD OF SHIPPING

Mailable Items. We ship UPS for fastest delivery.
Include Zone from Zone Chart [   ]

Indicate other Preference_____
Blue Label Zone Customers: Please indicate UPS Blue Label Air Service if desired.

Motor Freight Items. Shipped transportation charges collect. If a single item is Motor Freight, all items will be shipped Motor Freight.

❺ If merchandise is ordered from another catalog, please indicate catalog no. (from front cover)

❻ Please give daytime phone number.
[ ][ ][ ] [ ][ ][ ] [ ][ ][ ][ ]
(Area)   (Number)

❼ What new kits would you like us to make?_____

❽ QUAN.	MODEL NO.	KIT DESCRIPTION	UNIT PRICE	UNIT TOTAL PRICE	SHPG. WT.	SHPG. CHARGES*

❾ METHOD OF PAYMENT (check one)

☐ **Cash** — Check or money order only. If the charge for merchandise and transportation is less than the amount you send, we will refund the difference.

☐ **C.O.D.** — For orders of $10 or more only. 20% deposit (check or money order) must accompany order. You pay balance (by cash, money order or certified check) along with C.O.D. fees, at delivery time.

☐ **Heath Revolving Charge**
☐ New Acc't. (Please fill out on reverse side.)
☐ Add to my existing Account

No._____

Signature_____
(necessary to send merchandise)

C.O.D. ORDERS

TOTAL AMOUNT OF ORDER	
Less 20% Deposit —	
Net Amount C.O.D.	

REVOLVING CHARGE ORDERS

TOTAL AMOUNT OF ORDER	
LESS: Down Payment —	
TOTAL AMOUNT less Down Payment	

			TOTAL SHPG. CHARGES	
TOTAL				
less allowance, if any —				
Merchandise **TOTAL** +				
Add 4% sales tax for all Michigan deliveries +				
Shpg. Charges from above +				
Plus amount due from previous order: Invoice #_____ +				
TOTAL AMOUNT OF ORDER				

*Shipping Charges are for mailable items only. Figure charges for each item individually. See Rate Chart on page 52.

TO: HEATH COMPANY, BENTON HARBOR, MICHIGAN 49022: REVOLVING CHARGE SECURITY AGREEMENT

I hereby purchase the total amount of merchandise listed on the reverse side plus shipping charges and tax, if any, less down payment, if any, plus the **FINANCE CHARGE** which, in lieu of being added to this contract in total as of the date hereof will be added monthly on the previous month's ending balance of my account before deducting payments and credits or adding purchases made during the current billing period. **FINANCE CHARGE** will be assessed on the balance according to the following schedule or in accordance with the laws of the State of my residence which ever is the lesser.

Account Balance Amount: ALL BALANCES. Periodic Percentage Rate: 1½%

ANNUAL PERCENTAGE RATE: 18%

The minimum **FINANCE CHARGE** assessed will be 50¢ on any small balances. If within 30 days from my billing date I pay the full outstanding balance shown on my statement, no **FINANCE CHARGE** on such balance, will be charged on any subsequent statement. The highest level of my balance reflected by the payment chart will govern my monthly payment, beginning 30 days from the cycle closing date shown on the statement, until such time as the total unpaid balance of each purchase is fully paid (minimum $10). Regular or Extended Terms are the two plans available for my use. To use the extended plan, the balance of my account must be at least $500.00. The amount of my monthly installment is determined from charts below.

REGULAR REVOLVING CHARGE

Charge up to:	$150	200	250	300	350	400	450	500
Pay Monthly:	$10	15	20	25	30	35	40	45

EXTENDED REVOLVING CHARGE

Charge up to:	$600	700	800	900	1000	1100	1200	1300	1400	1500
Pay Monthly:	$30	35	40	45	50	55	60	65	70	75

Add $5 per month for every $100 or fraction thereof over $1500.

I hereby grant to the above named creditor a security interest in all goods purchased until the purchase price and **FINANCE CHARGE** have been paid in full. I will not sell, transfer possession of, remove or encumber the property without my written consent. The account may be declared in default and the matters regarding default, right to cure (if any) and acceleration of account balances will be governed by the consumer protection laws of the state of my residence. My installments shall be applied as follows. In case of items purchased on different dates, the first purchase shall be deemed first paid for. In case of items purchased on the same date, the lowest price shall be deemed first paid for. We intend to obtain a consumer report in connection with the processing of your credit application. Upon request you will be informed of the name and address of the consumer reporting agency that furnished the report. You may inspect your report by contacting the reporting agency that made it. Subsequently consumer reports may be obtained from time to time in connection with the maintenance of your account.

NOTICE TO BUYER: 1. Do not sign this agreement before you read it or if it contains blank spaces. You are entitled to a copy of the agreement you sign. 2. The other side of this page is part of this contract. Notice: See accompanying statement for important information regarding your rights to dispute billing errors.

3. NOTICE: ANY HOLDER OF THIS CONSUMER CREDIT CONTRACT IS SUBJECT TO ALL CLAIMS AND DEFENSES WHICH THE DEBTOR COULD ASSERT AGAINST THE SELLER OF GOODS OR SERVICES OBTAINED PURSUANT HERETO OR WITH THE PROCEEDS HEREOF. RECOVERY HEREUNDER BY THE DEBTOR SHALL NOT EXCEED AMOUNTS PAID BY THE DEBTOR HEREUNDER.

TYPE OF ACCOUNT	Sign here_____ Date_____	Check Revolving Charge Plan Desired
☐ INDIVIDUAL ☐ JOINT	(Customer's Signature) Sign here_____ Date_____ (Spouse's Signature) If Joint Account	☐ Regular ☐ Extended

WHEN ORDERING, BE SURE TO REMOVE ENTIRE PAGE.

FILL IN IF YOU ARE A NEW ACCOUNT, OR IF YOUR PREVIOUS ACCOUNT HAS BEEN PAID UP FOR 12 MONTHS OR MORE.

CREDIT APPLICATION TO: HEATH COMPANY, BENTON HARBOR, MICHIGAN 49022   Former Account No._____

IMPORTANT: Please fill in completely.   Omissions and errors cause delays   SIGN REVOLVING AGREEMENT

ACCOUNT To Be In The Name Of		AGE	No. of Dependent Children
First Initial Last			
Present Residence: Address — Street		Area Code + Phone Number	
City State Zip		How Long ___YRS. ___MO	
☐ OWN ☐ RENT ☐ BOARD ☐ MARRIED ☐ UNMARRIED ☐ SEPARATED TYPE OF ACCOUNT ☐ INDIVIDUAL ☐ JOINT		Social Security Number	
Monthly Rent or Mortgage Payments $_____			
Former Address If Less Than 3 Yrs. At Present Address Street City State Zip		How Long ___YRS. ___MO	

COMPLETE FOR PERSON REQUESTING ACCOUNT:

Employer's Name (Give Firm's Full Name)	How Long ___YRS ___MO	Position	Salary (Monthly) $	Business Phone
Employer's Address	(Child support, alimony and separate maintenance optional.) Other Income — Source(s)			Amount (Monthly) $
Former Employer — Name-Address		Position	How Long ___YRS ___MO	Salary (Monthly) $
Bank — Branch Address City State Zip			☐ Check ☐ Loan ☐ Savings	

CREDIT REFERENCE: (Give Merchants, Firms, or Finance Companies with whom you do or have done business)

Firm Name	Address — Street, City, State	Account No.	Balance

Name Nearest Relative Not At Your Present Address	Relationship	Relative's Address

COMPLETE FOR SPOUSE IF JOINT ACCOUNT REQUESTED:

Spouse's Full Name (First, Initial, Last)	Age	Social Security Number
Employer's Name (Give Firm's Name)	Employer's Address	Business Phone
How Long ___YRS ___MO Position Salary (Monthly) $ Bank — Branch		☐ Check ☐ Savings ☐ Loan

MONEY-BACK MANUAL PREVIEW

MONEY-BACK MANUAL OFFER. All kits come with manuals, but if you'd like to see how easy kitbuilding is, you can order the manual first. And we'll deduct the price of the manual when you buy the kit. Simply include manual invoice with your order.

Be sure to send manual orders on a separate sheet of paper. Manuals are $4 each except for the following: color TV's, organs, H9, H10, H8-18, WH8, WH11A, SB-104A, HW-101, AN-2016A, AR-1515, AA-1515, AJ-1600, AP-1800, AA-1640, AJ-1510A, AR-1500A, SO-4105, SO-4235, IP-2711, and ET series, which are $7 each. Add 50¢ postage and handling for each manual ordered. Write Heath Company, Parts Dept., Benton Harbor, MI 49022.

Copies of the Heathkit warranty or warranties for any other consumer product in this catalog costing more than $15 may be obtained free of charge by writing the Manager of Marketing Services, Heath Company, Benton Harbor, MI 49022.

CAREER OPPORTUNITIES AT HEATH. Heath Company has several challenging positions open in the areas of Electrical Design Service. If your expertise is in instrumentation, audio, communications or computer equipment, please feel free to send resumes and salary requirements to:

Heath Company, Personnel Department, Benton Harbor, MI 49022
We are an Equal Opportunity Employer M/F.

SEE HEATHKIT PRODUCTS ON EXHIBIT AT THE FOLLOWING SHOWS:

Jan. 26, 27	Tropical Ham Show	Miami
Feb. 20-27	International Boat Show	Miami Beach
Feb. 25-27	International Learning Expo	Washington, DC
Mar. 14-16	Computer Fair	San Francisco
Mar. 24-28	AIAA Industrial Arts Show	St. Louis

NOTE: From time to time we make our mailing lists available to reputable businesses with offers we think would be of interest to you. If you do not wish to receive such offers, please send us the address label from your catalog with your request to: Heath Company, Dept. 597-999, Benton Harbor, MI 49022.

The President's Corner

Dear Friends,

Our Heathkit products, which are all produced in Benton Harbor, Michigan, are sold in more than 60 countries. The engineering design of the product, the manual writing and its printing, the sub-assemblies, the packaging of the parts and quality assurance are all "made in the U.S.A."

However, whether it be within engineering, the manual preparation or other functions, we keep our friends living across the oceans in mind. For instance, we usually supply dual transformers and give measurements in both inches and centimeters, and we have some educational programs available in French, Spanish and German. Those are the more easily accomplished common denominators. The more difficult task is in selecting products and styling which will be pleasing to anyone, regardless of the country in which he lives. We haven't always been successful in this challenge; however, we have noticed a decided change in the past few years. More and more, what the Europeans desire is similar to the desires of those living in Oceania, and in turn is much like our preferences in this country.

By way of example, I have traveled within Europe for many years. Unlike the earlier trips, now I can order fried eggs sunny side up for breakfast, a Big Mac for lunch and a New York cut steak for dinner. I must admit this takes a bit of the charm of traveling away; however, more significantly, it certainly adds to the cost. N'est ce pas?

D. W. Nurse   David W. Nurse
President

Visit our Factory Store in Michigan

A Heath Customer Center is located alongside our production facility on Hilltop Road in Saint Joseph, Michigan. Next time you're in the area, stop in and take advantage of our MAIL ORDER PRICES, IMMEDIATE DELIVERY and expert SERVICE! Store hours are 9 AM to 5 PM Monday through Friday and 9 AM to 4 PM on Saturdays. From Interstate 94, take Exit 27, Niles Ave. north to Hilltop Road. Take Hilltop Road west to Heath Company (just west of Cleveland Ave.)

The following notice is required by the Fair Credit Billing Act:

IN CASE OF ERRORS OR INQUIRIES ABOUT YOUR BILL

The Federal Truth in Lending Act requires prompt correction of billing mistakes.

1. If you want to preserve your rights under the Act, here's what to do if you think your bill is wrong or if you need more information about an item on your bill:

   a. Do not write on the bill. On a separate sheet of paper write (you may telephone your inquiry but *doing so will not preserve your rights under this law*) the following:

   i . Your name and account number (if any).

   ii. A description of the error and an explanation (to the extent you can explain) why you believe it is in error.

   If you only need more information, explain the item you are not sure about and, if you wish, ask for evidence of the charge such as a copy of the charge slip. Do not send in your copy of a sales slip or other document unless you have a duplicate copy for your records.

   iii. The dollar amount of the suspected error.

   iv. Any other information (such as your address) which you think will help the creditor to identify you or the reason for your complaint or inquiry.

   b. Send your billing error notice to the address on your bill which is listed after the words: "Send Inquiries to:,"

   Mail it as soon as you can, but in any case, early enough to reach the creditor within 60 days after the bill was mailed to you. If you have authorized your bank to automatically pay from your checking or savings account any credit card bills from that bank, you can stop or reverse payment on any amount you think is wrong by mailing your notice so the creditor receives it within 16 days after the bill was sent to you. However, you do not have to meet this 16-day deadline to get the creditor to investigate your billing error claim.

2. The creditor must acknowledge all letters pointing out possible errors within 30 days of receipt, unless the creditor is able to correct your bill during that 30 days. Within 90 days after receiving your letter, the creditor must either correct the error or explain why the creditor believes the bill was correct. Once the creditor has explained the bill, the creditor has no further obligation to you even though you still believe there is an error, except as provided in paragraph 5 below.

3. After the creditor has been notified, neither the creditor nor an attorney nor a collection agency may send you collection letters or take other collection action with respect

to the amount in dispute; but periodic statements may be sent to you, and the disputed amount can be applied against your credit limit. You cannot be threatened with damage to your credit rating or sued for the amount in question, nor can the disputed amount be reported to a credit bureau or to other creditors as delinquent until the creditor has answered your inquiry. However, *you remain obligated to pay the parts of your bill not in dispute.*

4. If it is determined that the creditor has made a mistake on your bill, you will not have to pay any *FINANCE CHARGES* on any disputed amount. If it turns out that the creditor has not made an error, you may have to pay *FINANCE CHARGES* on the amount in dispute, and you will have to make up any missed minimum or required payments on the disputed amount. Unless you have agreed that your bill was correct, the creditor must send you a written notification of what you owe; and if it is determined that the creditor did make a mistake in billing the disputed amount, you must be given the time to pay which you normally are given to pay undisputed amounts before any more *FINANCE CHARGES* or late payment charges on the disputed amount can be charged to you.

5. If the creditor's explanation does not satisfy you and you notify the creditor *in writing* within *10 days* after you receive his explanation that you still refuse to pay the disputed amount, the creditor may report you to credit bureaus and other creditors and may pursue regular collection procedures, but the creditor must also report that you think you do not owe the money, and the creditor must let you know to whom such reports were made. Once the matter has been settled between you and the creditor, the creditor must notify those to whom the creditor reported you as delinquent of the subsequent resolution.

6. If the creditor does not follow these rules, the creditor is not allowed to collect the first $50 of the disputed amount and *FINANCE CHARGES*, even if the bill turns out to be correct.

7. If you have a problem with property or services purchased with a credit card, you may have the right not to pay the remaining amount due on them, if you first try in good faith to return them or give the merchant a chance to correct the problem. There are two limitations on this right:

   a. You must have bought them in your home state or if not within your home state within 100 miles of your current mailing address; and

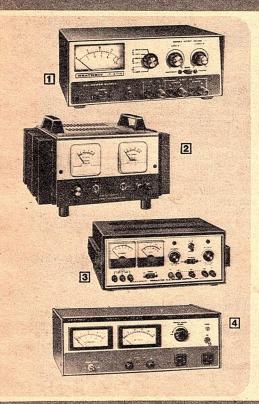   b. The purchase price must have been more than $50.

However, these limitations do not apply if the merchant is owned or operated by the creditor, or if the creditor mailed you the advertisement for the property or services.

Heathkit Test Equipment gives you great value and performance

Heathkit Test Equipment is among the best you can buy anywhere at any price. Care in engineering and top quality materials mean that the test equipment you buy from Heath will perform up to the highest standards for years to come. Thousands of amateur and professional technicians around the world can attest to Heath reliability. Heathkit Test Instruments are more than just a purchase; they are an investment in your future as you continue to grow in your electronics hobby or career.

When you purchase a Heathkit Instrument you purchase years of engineering expertise in the field of test equipment design. Order your first piece of test gear from Heath and you'll agree; Heath is truly the best there is.

Heathkit Power Supplies to meet your special testing or design requirements

[1] Tri-Output Power Supply combines fixed 5 VDC output with two continuously adjustable 0-20 VDC outputs for circuit designs requiring more than one voltage supply. The outputs of the two 20V supplies and the 5V output can be interconnected in any combination to provide both positive and negative voltages with a fixed reference, or they can be allowed to "float."

Kit IP-2718, Shpg. wt. 12 lbs. 89.95
Assembled SP-2718, Shpg. wt. 12 lbs. 185.00

IP-2718 SPECIFICATIONS: Regulation: Load: less than 0.1% variation from no load to full load on 20V supplies; less than 3% variation from no load to full load on 5V supply. **Line:** less than 0.2% variation for line voltage change of 10V on 20V supplies; less than 0.15% variation for line voltage change of 10V on 5V supply. **Power Requirement:** 120/240 VAC, 60/50 Hz, 100W full load. **Dimensions:** 4½" H x 10¾" W x 9" D.

[2] Power Supply/Battery Eliminator is clean, accurate voltage source for servicing Ham, Marine and CB communications gear. Two easy-to-read front panel meters continuously variable voltage selection from 9 to 15 VDC.

Kit IP-2715, Shpg. wt. 31 lbs. 139.95

IP-2715 SPECIFICATIONS: Output Voltage: variable from 9-15 VDC. **Output Current:** 12 amps continuous, 20 amps intermittent (per derating curve in manual). **Ripple:** less than 1% at full load. **Regulation:** less than 2% variation from no load to full load. **Fuses:** 7A, 3 AG slow-blow primary; 20A, 3 AG output. **Power Requirement:** 110-130 VAC, 7A or 220-260 VAC, 3.5 A, 60/50 Hz. **Dimensions:** 5¼" H x 11" W x 11" D.
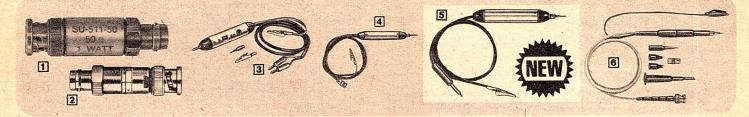
[3] General-Purpose Power Supply. 0-400 VDC output at 0-100 mA continuous (125 mA intermittent). 120/240 VAC, 50/60 Hz.
Kit IP-2717, Shpg. wt. 19 lbs. 119.95
SP-2717, Assembled, tested, 19 lbs. 210.00

[4] Variable Isolated AC Power Supply. Continuously variable 0-140 VAC output, with complete isolation from AC line. Input voltage is 120 VAC, 60 Hz. Output current is 3 A max.
Kit IP-5220, Shpg. wt. 28 lbs. 129.95

Reliable General-Purpose Power Supplies to fill a special place on your bench

Kit IP-2710, 30V @ 3A analog.
Shpg. wt. 34 lbs. 169.95
Assembled SP-2710, 30V analog.
Shpg. wt. 34 lbs. 280.00
Kit IP-2711, 30V @ 3A digital.
Shpg. wt. 36 lbs. 229.95
Assembled SP-2711, 30V digital.
Shpg. wt. 35 lbs. 350.00
Kit IP-2728, 1-15 VDC regulated.
Shpg. wt. 5 lbs. 26.95

Get more versatility and convenience from your Heathkit Instrument with these Probes and Accessories

[1] 50-Ohm Termination. Used to eliminate improperly terminated cables which can cause incorrect display in frequency counters and distorted waveforms in scopes. DC to 1 GHz; power rating, 1 watt. VSWR; 250 MHz, 1.2:1, 600 MHz, 2:1.
Assembled SU-511-50, Shpg. wt. 1 lb. 19.00

[2] RF Fuse in UHF BNC-to-BNC connector. Prevents burnout. DC to 500 MHz range; 50 ohms; 1.2:1 VSWR (max.); insertion loss 1.80 dB max. at 500 MHz. With spare fuses.
Assembled SU-512-50, Shpg. wt. 1 lb. 50.00

[3] Low capacitance scope probe provides direct or X10 attenuated operation; options for 3.3 or 1 megohm input resistance. Banana plug/BNC wiring option.
Kit PK-1, Shpg. wt. 1 lb. 8.95

[4] Scope demodulator probe for distortion checks, RF & IF display. 30 V rms max., 500 VDC max. Banana plug/BNC wiring option.
Kit 337-C, Shpg. wt. 1 lb. 5.95

[5] RF Probe provides RF voltage measurement capability for any 10 or 11 megohm DC input voltmeter. Frequency response is linear from 1000 Hz to over 100 MHz. Includes banana plug for 10 megohm input and phone plug for 11 megohm input.
Kit PK-3A, Shpg. wt. 1 lb. 9.95
Assembled PKW-3A, Shpg. wt. 1 lb. 14.95

[6] Combination X1, X10 Scope Probe. Has 2-position multiplier for X1 and X10 probe tip. DC to 15 MHz (X1) and DC to 80 MHz (X10) bandwidths. X10 risetime, 4.0 nS. Compensation range of 15-50 pF. Includes probe with 3-position slide switch, 4½ ft. cable.
Assembled PKW-105, Shpg. wt. 1 lb. 27.95

Accessory cables...for inter-connecting scopes, counters, etc. All cable is RG-58/U, 50 ohm impedance. Shpg. wt. (each), 1 lb.
Assembled SU-501-3, 3 ft., BNC/BNC 7.50
Assembled SU-501-6, 6 ft., BNC/BNC 7.50
Assembled SU-503-3, 3 ft., BNC/Banana 7.50

Build your own test bench—and save—with our 5280 Series

The 5280 Series of test instruments is designed for the beginning hobbyist, student or service-man. It's an excellent way to assemble a truly versatile test bench, without spending a lot of money. The 5280 Series will let you work on many types of electrical and electronic equipment. Whether you're doing service work or just experimenting, each 5280 Series instrument represents real value for your test equipment dollar.

1 Multimeter for volts/ohms/DC current

The Heathkit IM-5284 high performance solid state multimeter gives you 4 different functions and a large easy-to-read panel meter. Features include AC and DC voltage measurement to 1000 volts and DC current measurement to 1000 mA full scale. The ohmmeter function is divided into four ranges, X1, X100, X10k, and X1MΩ. Power requirements are met by internal batteries or by the optional IPA-5280-1 power supply and 1 "C" cell. Includes test probes.

Kit IM-5284, Shpg. wt. 5 lbs. 37.95

IM-5284 SPECIFICATIONS: DC Voltmeter: Ranges: 0-1, 0-10, 0-100, 0-1000 volts full scale. Accuracy: ±3% of full scale. AC Voltmeter: Ranges: 0-1, 0-10, 0-100, 0-1000 volts full scale. Accuracy: ±5% of full scale. DC Milliammeter: Ranges: 0-1, 0-10, 0-100, 0-1000 mA full scale. DC Input Resistance: 10 megohms. AC Input Resistance: 1 megohm. Ohmmeter: Ranges: X1, X100, X1k, X1MΩ. Power requirements: Two 9-volt batteries and 1 "C" cell or IPA-5280-1 Power Supply and 1 "C" cell. Dimensions: 5¾" H x 11" W x 7¾" D (14.6 cm H x 27.9 cm W x 19.7 cm D).

2 RF Oscillator for radio/TV alignment

This unit, which includes probes, is suitable for use in alignment of tuned stages in AM, FM, and television receivers. Output is divided into five bands, from 310 kHz to 110 MHz, and features an extra 100 to 220 MHz band of calibrated harmonics. An added feature of the IG-5280 is its 1000 Hz audio output. This signal, available at a front panel jack, is ideal for tracing and isolation of circuit defects in receiver audio stages and also serves as a source of internal AM modulation. Includes test leads.

Kit IG-5280, Shpg. wt. 5 lbs. 37.95

IG-5280 SPECIFICATIONS: RF Output: Frequency Range: 310 kHz to 110 MHz in five bands, 100 MHz to 220 MHz on harmonics. Output voltage: 100 mV approx. Internal Modulation: 1000 Hz. AF Output: Frequency: 1000 Hz. Output Voltage: 2.0 volts rms (open circuit). Power Requirements: Two 9-volt batteries of IPA-5280-1 power supply. Dimensions: 5¾" H x 11" W x 7¾" D.

3 Sine/Square Wave Audio Oscillator

The IG-5282 Audio Oscillator is an instrument that you'll find useful in many audio test applications. Frequency output is in four ranges, from 10 Hz to 100 kHz, in either sine or square wave modes. Use the IG-5282 as an audio signal source during signal tracing or, with the appropriate associated equipment, use the sine wave output for audio stage gain and distortion analysis. If you're interested in determining frequency response, you'll find the IG-5282's square wave output ideal for your purposes (with appropriate associated equipment). Construction is rugged and assembly time is greatly reduced by single circuit board assembly. A great addition for your test bench.

Kit IG-5282, Shpg. wt. 5 lbs. 37.95

IG-5282 SPECIFICATIONS: Frequency Output: 10 Hz to 100 kHz in four ranges. Sine Wave Output Voltage: 0-3 volts rms. Square Wave Output Voltage: 0-3 volts peak. Power Requirements: Two 9-volt batteries or the optional IPA-5280-1 Power Supply. Dimensions: 5¾" H x 11" W x 7¾" D (14.6 cm H x 27.9 cm W x 19.7 cm D). Weight: 3¼ lbs.

4 RCL Bridge ideal for design work

The IB-5281 RCL Bridge is priced right for your pocket book and has the features that you can appreciate. Solid-state circuitry lets you easily determine unknown values of resistance, inductance and capacitance. Resistance is indicated in three ranges from 10Ω to 10MΩ, inductance in three ranges from 10 µH to 10H and capacitance, also in three ranges, from 10 pF to 10 µF. Easy single circuit board construction speeds up assembly. Housed in a tough 5280 Series cabinet. With component clips.

Kit IB-5281, Shpg. wt. 5 lbs. 37.95

IB-5281 SPECIFICATIONS: Resistance Ranges: 10Ω to 10MΩ in three ranges. Inductance Ranges: 10 µH to 10H in three ranges. Capacitance Ranges: 10 pF to 10 µF in three ranges. Oscillator Frequencies: 1 kHz, 10 kHz, 100 kHz. External Standard Range: 1:1 to 10:1. Power Requirements: two 9-volt batteries, or IPA-5280-1 power supply. Dimensions: 5¾" H x 11" W x 7¾" D. Weight: 3½ lbs.

5 Signal Tracer for audio circuits
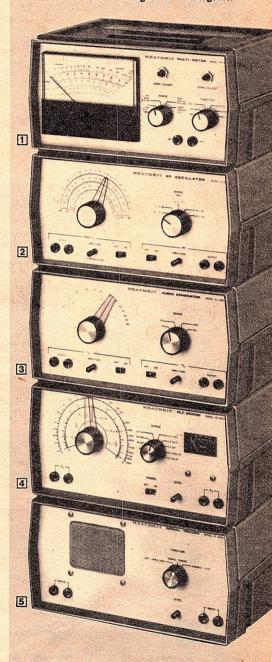
If you have been waiting to add an audio signal tracer to your bench because the price was just too high...look again. The IT-5283 Signal Tracer makes a great, low-priced addition to your trouble-shooting arsenal. A diode-equipped RF probe (furnished with the kit) lets you quickly trace radio and television receiver and transmitter circuits to reveal component and stage failures. When you flip the probe to its straight through (DC) position, you are able to locate defective circuitry in all types of audio components and systems with ease. By placing the IT-5283 in the audible position, the Signal Tracer emits a tone that changes in frequency depending on the test point voltage or resistance, thereby allowing you to easily trace signal flow through logic circuits to isolate problems.

Kit IT-5283, Shpg. wt. 5 lbs. 37.95

IT-5283 SPECIFICATIONS: Functions: Substitute speaker, AF signal tracing, RF signal tracing, Audible volt/ohmmeter. Speaker: 3" permanent magnet. Power Requirements: Two 9-volt batteries and/or IPA-6280 power supply. Cabinet Dimensions: 5¾" H x 11" W x 7¾" D (14.6 cm H x 27.9 cm W x 19.7 cm D). Weight: 3¼ lbs.

5280 Series 120/240 VAC Power Supply

Not shown. Provides all voltages required by 5280 Series instruments from 120 or 240 VAC, can power all five instruments simultaneously.

Kit IPA-5280-1, Shpg. wt. 3 lbs. 24.95

5280 Series instruments — designed to work together

Use our top-value starter test instruments to set up your test bench, using the IPA-5280-1 Power Supply to power your 5280 Series instruments

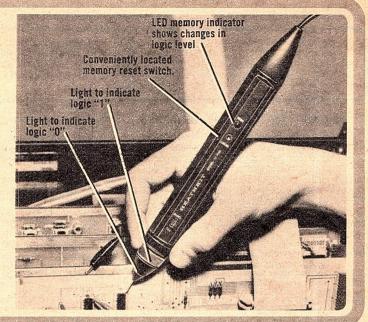# Quality Heathkit test instruments make service fast and easy

High-performance logic probe for TTL/CMOS digital circuits

The Heathkit IT-7410 detects and indicates both high and low logic levels in TTL or CMOS digital circuitry. It also indicates the polarity and presence of signal pulses as short as 10 nsec duration, and shows intermediate or "bad" logic levels.

Simply touch the probe tip to an IC pin to observe the following conditions. Both indicators off shows open circuit or abnormal level (between thresholds). The low (white) indicator on shows constant logic zero. The high (red) indicator on shows constant logic one. Both indicators flash at a 5 Hz or lower rate to show signal pulses. One indicator flashing shows normal to abnormal logic levels. A separate manually reset memory indicator is lit whenever any transition in logic levels occurs.

The probe is equipped with 34" power leads with strain relief and color-coded mini-clips; detachable high-frequency ground clip. The unit is powered by the circuit under test, or a separate regulated DC power supply.

Kit IT-7410, Shpg. wt. 1 lb. **39.95**
Factory assembled and tested version of above.
ST-7410, Shpg. wt. 1 lb. **64.95**

IT-7410 SPECIFICATIONS: DC Threshold Levels: switch-selected, TTL logic "zero", .8V ±.15, logic "one", 2.1V ±.25 @ 5VDC. CMOS logic "zero", 30% ± 10% of supply voltage, logic "one", 70% ± 10% of supply voltage. **Input Impedance:** 400k ohms, parallel with 10pF. **Response Limits:** TTL or CMOS at 5VDC — single pulse or pulse train, 10 nS min. Square wave, 100 MHz max. CMOS at 15 VDC — single pulse or pulse train, 10 nS min. Square wave, 80 MHz max. **Power Requirement:** TTL — 4.75 to 5.5VDC @ 75 mA max. CMOS — 4.75 to 15VDC @ 115 mA max. **Dimensions:** ¾" H x 1" W x 9¼" L.

LED memory indicator shows changes in logic level
Conveniently located memory reset switch.
Light to indicate logic "1"
Light to indicate logic "0"

General-purpose RF Generator makes testing fast and easy
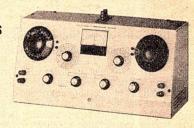
The IG-5242 provides accurate and stable radio frequencies for precision testing of RF and IF stages, measuring gain and image rejection and determining sensitivity. Frequency coverage is from 100 kHz to 30 MHz with ±3% adjustable frequency calibration. RF output voltage adjusts from 5 to 100,000 µV in five attenuated steps with 5:1 variable attenuation. Output can be modulated from 0-50% with 5% accuracy. Easy kit assembly.
Kit IG-5242, Shpg. wt. 14 lbs. **119.95**

IG-5242 SPECIFICATIONS: RF OUTPUT. Frequency Range: 100 kHz to 30 MHz in five bands. **Accuracy:** ±5%. **Output Impedance:** 50 ohms. **Output Voltage:** variable from .005 to 100 mV. **INTERNAL MODULATION. Frequency:** 400 Hz. **Depth:** variable from 0-50%. **Front Panel Controls:** Modulation, variable frequency and level controls; function, meter and millivolts F.S. switches. **Power Requirement:** 120/240 VAC, 50/60 Hz, 30 watts. **Dimensions:** 10" H x 13" W x 7¾" D.
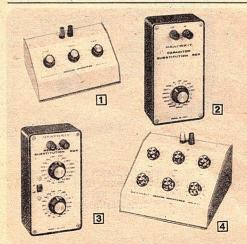
High-accuracy Impedance Bridge for easy measurements

Has four separate bridge circuits for accurate measurement of resistance, capacitance, and low & high inductance, dissipation factor of capacitors and storage factor of inductors. Requires headphones or oscilloscope for alignment.
Kit IB-3128, Shpg. wt. 11 lbs. **159.95**
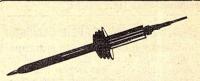
IB-3128 SPECIFICATIONS: DC Measurements: Built-in power supply. Binding posts for external supply. **Meter:** 100-0-100 microampere meter. **AC Measurements:** Built-in 1000 Hz generator. Terminals for external generator. **Detector:** Vacuum tube detector and amplifier, using built-in meter. Terminals for external detector. **Resistance:** 0.1 ohm to 10 megohm. **Capacitance:** 100 pF to 100 µF. **Inductance:** 0.1 mH to 100 H. **Dissipation Factor:** (D) 0.002 to 1. **Storage Factor:** (Q) 0.1 to 1000. **Accuracy:** ½% decade resistors used. **Power Supply:** Transformer and silicon rectifier. **Power Requirement:** 120/240 VAC, 60/50 Hz, 10 watts. **Dimensions:** 8" H x 17" W x 6" D.

Instruments to simplify testing

1 Decade Capacitance Box. Functions as a wide-range variable capacitor for design work, helps you determine unknown capacitance values without involved calculations. Covers 100 pF to 0.111 µF in 100 pF increments. 400 VDC rating.
Kit IN-3127, Shpg. wt. 2 lbs. **26.95**

2 Capacitor Substitution Box. Provides switch selection of 18 EIA standard capacitors from 100 pF to 0.22 µF. All are rated at 600 V, except 3 lowest and 2 highest values, 500 and 400 V respectively. **Kit IN-3147,** Shpg. wt. 2 lbs. . . **14.95**

3 Resistor Substitution Box. Provides switch selection of 36 standard 10% 1-watt resistors from 15 ohms to 10 meg. **Kit IN-3137,** Shpg. wt. 2 lbs. **14.95**

4 Decade Resistance Box. Covers 1 ohm to 999,999 ohms in 1 ohm steps. Use with IN-3127 to solve complex resistance and capacitance network problems. Resistors are 1-watt, 0.5% tolerance. **Kit IN-3117,** Shpg. wt. 3 lbs. **44.95**

Heathkit Instrument Test Probes

IMA-100-10 multiplies DC ranges of any 10-megohm meter by 100, measures voltages as low as 1 V in high impedance circuits. **Kit IMA-100-10,** 1 lb. **11.95**

IMA-100-11 provides X100 measurement for meters with 11-megohm input impedance (incl. probe resistance). **Kit IMA-100-11,** 1 lb. **11.95**
Assembled SMA-100-11, 1 lb. **17.95**

IMA-1000-1 provides X1000 attenuation for meters with 1-megohm input impedance. **Kit IMA-1000-1,** 1 lb. **11.95**

High-performance test equipment for semiconductors & IC's

Negative resistance and interbase resistance (Rbb) for unijunction transistors.

Thermal runaway, leakage, linearity, beta, output admittance, saturation for bipolar transistors.

Typical field effect transistor display showing drain current versus drain voltage.

Field effect transistor breakdown.

Curve Tracer makes semiconductor testing faster and simpler

Take the guesswork out of semiconductor testing with the Heathkit IT-3121 Curve Tracer. An invaluable tool for the designer, technician or the serious electronic hobbyist. Just connect the IT-3121 to any oscilloscope with horizontal sensitivity of 0.5 V/div. and vertical sensitivity of 1 V/div. and adjustable horizontal gain. Devices such as bipolar transistors, diodes, SCRs, triacs, FETs, etc. can be inspected or tested for specific applications. Plug-in cables are supplied for fast, easy scope hookup. A calibration switch permits fast and accurate scope calibration. You can display most fundamental parameters (see insets for typical displays). The extensive manual included in each kit tells how to interpret each display. Low profile styling and the sloped front panel permit the Curve Tracer to sit in front of most oscilloscopes without blocking the CRT. Extra leads (included) allow you to test large devices or make in-circuit tests.

Kit IT-3121, Shpg. wt. 10 lbs. **99.95**

IT-3121 SPECIFICATIONS: **Sweep Voltage Ranges:** 0-40 volts at 1 ampere max. 0-200 volts at 200 mA max. **Sweep Voltage Sampling:** .1, .2, .5, 1, 2, 5, 10, 20 and 50 V/div. ±3%. **Sweep Current Sampling:** .5, 1, 2, 5, 10, 50, 100 and 200 mA/div. ±%. **Sweep Dissipation Resistors:** 0, 10, 50, 100, 500, 1000, 5000, 10k, 50k, 100k, 500k, 1 meg ±10%. **Step Currents:** .002, .005, .01, .02, .1, .2, 2, 5, and 10 mA/step, ±3%, ±250 nA offset current max. **Step Voltages:** .05, .1, .2, .5, and 1 volt/step, +3%, ±5% mA maximum offset voltage. **Calibration Source:** 9 volts ±2%. in 1 volt steps. **Polarity:** PNP and NPN (P Channel - N Channel). **Oscilloscope Requirements:** Bandwidth to 20 kHz or greater. (DC-coupled oscilloscope is recommended). **Power Requirement:** 110 to 130 or 220 to 260 VAC. **Dimensions:** 4½" H x 11¼" W x 10" D.

Low-cost Heathkit Testers add convenience and versatility to your bench

1 Heathkit deluxe Digital IC Tester gives you fast, easy IC checks

A "must for anyone working with digital integrated circuits. Lets you determine functions of IC's, check operation against your own data sheets. Features a special high-quality "zero-force" insertion socket — the same as used in expensive production-line testers — that lets you make thousands of insertions and extractions without worrying about bent pins. Exclusive "bounce-free," mercury stepping switch allows safe and easy "exercising" of multi-function IC's such as flip-flops. Has input-output jacks for each pin; neon indicators. Exceptionally easy to operate — 14- or 16-pin IC's can be installed in any position. Ideal for use with the Digital Techniques Program (see page 69).

Kit IT-7400, Shpg. wt. 6 lbs. **74.95**

IT-7400 SPECIFICATIONS: **Pull-up Resistors:** externally connected, with patch terminals. **Patch Terminals:** one at each pin. **Selector Switches:** two at each terminal, one for +5V, step, or off; the other for gas discharge or ground. **Gas Discharge:** allows direct driving of neon indicator lamp for high voltage decoder driver. **Power Supply:** 5 VDC regulated, ±5%, 300 mA and 3.6 VDC, switch selected. **Power Requirement:** 100-135/200-270 VAC, 60/50 Hz. **Dimensions:** 4⅝" H x 11⅜" W x 9¼" D.

2 High-accuracy FET/Transistor Tester for in or out-of-circuit tests
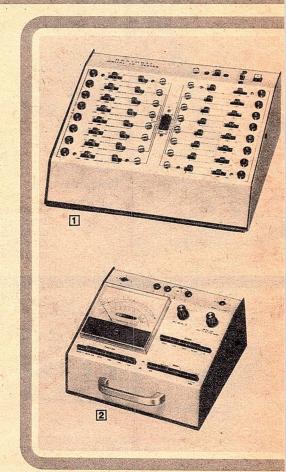
For quick, accurate tests of conventional (bi-polar) transistors, diodes, FETs, SCRs, triacs and unijunction transistors. Tests components either in-circuit using color-coded test leads supplied or out-of-circuit using built-in sockets. Shows gain (DC Beta), trans-conductance (Gm) and leakage directly on the large easy-to-read meter. Five current ranges permit leakage measurements as low as 1 μA and collector currents as high as 1 ampere. Has easy-to-use push-button function switches, special battery testing circuit that shows the condition of batteries' power supply, two-color front panel design with black lettering for conventional (bipolar) transistors and red lettering for FET's. Batteries not included.

Kit IT-3120, Shpg. wt. 5 lbs. **59.95**

IT-3120 SPECIFICATIONS: **Out-of-Circuit Accuracy:** ±5% for DC beta and leakage. **In-Circuit Accuracy:** Indicates good or bad transistor, FET, diode, SCR or triac. **Diode Test:** Tests for forward conduction and blocking. **Unijunction Transistor Test:** Measures Ieb_2s, Ib_2b_1s and emitter current. **Power Requirement:** Two 1½ V cells, (alkaline for best performance, not supplied). **Dimensions:** 5" H x 9⁷⁄₁₆" W x 8⅛" D.

Take this portable Transistor/Diode Checker with you anywhere for field checks

Transistor/Diode Checker. (Not shown). Checks high and low power transistors (NPN and PNP) for shorts, opens, leakage and current gain. Checks diodes for forward and reverse current; also can be used as a continuity tester. Has switches for FOR-REV/PNP-NPN, DIODE/HI-LO,

LEAKAGE-GAIN. Easy-to-read calibrated meter. Metal cabinet can be placed so that switches are on top or either side for most convenient operation. Uses two 1.5-volt "C" cells for easy portability. 3⅛" H x 3⅛" W x 3¾" D. Less batteries.

Kit IT-3127, Shpg. wt. 2 lbs. **12.95**
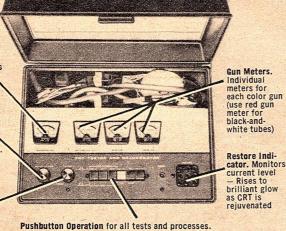
Heathkit TV service instruments save you time and money

Heater Voltage Meter. Accurately indicates heater voltage supplied to cathode of CRT

Heater Adjust Control. Sets voltage at CRT cathode for precise testing.

Cutoff/Power Control. Turns unit on or off, sets control grid voltage level

Gun Meters. Individual meters for each color gun (use red gun meter for black-and-white tubes)

Restore Indicator. Monitors current level — Rises to brilliant glow as CRT is rejuvenated

Pushbutton Operation for all tests and processes.

Low-Cost CRT Tester/Rejuvenator brings your old and worn TV picture tubes back to life — even in-line gun types!

Test, clean and rejuvenate almost all current CRT's including in-line-gun types. Positive action pushbuttons control all tests and processes for easy operation. Individual guns can be cleaned, tested and rejuvenated by using the front panel pushbuttons. And separate meters for each gun allow easy tracking of the individual grid currents. The main power control also sets control grid voltage level. A separate heater voltage meter allows monitoring of the heater voltage supplied to the cathode of the CRT. An indicator lamp gives visual confirmation of CRT short-circuits and the visual display restore indicator glows brighter as the rejuvenating current is increased. A separate cleaning process is applied after rejuvenation to assure proper tube operation. With 4' heavy-duty test cable.

Kit IT-5230, Shpg. wt. 9 lbs. **94.95**

Factory assembled version of above.
ST-5230, Shpg. wt. 9 lbs. **140.00**

IT-5230 SPECIFICATIONS: Sockets Supplied: 14-pin for 90° color tubes; 13-pin for in-line color tubes; 8-pin for black-and-white tubes; 7-pin for black-and-white tubes. **Heater Supply Voltage:** Variable from 2 volts to 12 volts at 1 ampere. **Power Requirement:** 120/240 VAC (ST-5230: 120 VAC.) **Dimensions:** 5.12" H x 13.5" W x 10" D.

charg·a·kit
HEATH REVOLVING CHARGE

Color level control adjusts the intensity of the three color levels

16 different pattern selections, including rainbow, dots, crosshatch, horizontal and vertical lines

Portable Color Alignment Generator for in-the-field service

The IG-5240 offers outstanding performance, with crystal-controlled carrier and color oscillator for real precision, accuracy and stability. Its convenient "shirt-pocket" size makes it the one to take along for in-the-field service calls every time. It's a versatile, low-cost service tool for hobbyists, too. The IG-5240 is really easy to operate. Simply connect its output cable to the VHF terminals of any color TV. The RF carrier frequency is calibrated for channel 4. An "on" pushbutton turns the IG-5240 on, four program slide switches select any of the 16 displays available. A color level control adjusts the color intensity of the three color patterns. A special "battery saver" timing circuit turns the display "off" automatically after a minimum of five minutes "on". This conserves battery power and lets you get the most efficient operation from your batteries. The unit uses two inexpensive 9-volt transistor batteries for a minimum of 8 hours continuous operation. For features, convenience and versatility, we don't think you can find a better color alignment generator than the IG-5240. Put this **truly portable** color alignment generator in your service shop today!

Kit IG-5240, Shpg. wt. 2 lbs. **64.95**

SG-5240, Factory assembled version of above. Shpg. wt. 1 lb. **95.00**

IG/SG-5240 SPECIFICATIONS: Chroma Carrier: 3563.795 kHz ±0.005% crystal-controlled. **Master Timer:** 377.616 kHz ±0.005% crystal-controlled. **RF Carrier:** Channel 4, 67.250 MHz ±0.01% crystal-controlled. **RF Output Level:** 5000 μV min. into 300 ohms. **Video Modulation:** 50% (approx.) **On-Time Interval:** 5 minutes min. OFF pushbutton can override time out. **Power Requirement:** Two 9-volt transistor batteries; with 180 mAH capacity (NEDA #1604). **Dimensions:** 5.4" L x 2.75" W x 1.15" D.

Easy to use and accurate – makes color TV service a breeze.

① Color Bar and Dot Pattern Generator for easy service

Provides 12 patterns plus a clear raster for purity adjustments, and patterns are available in the exclusive Heath 3x3 display or the familiar 9x9. Has RF output for channels 2 through 6, variable up to 50,000 μV, variable plus and minus going video, front panel gun shorting switches and lead piercing grid jacks, front panel sync output, 4.5 MHz sound carrier oscillator, two 500W AC receptacles. For 120/240 VAC, 50/60 Hz. 5½" H x 13½" W x 8" D.

Kit IG-5228. Shpg. wt. 8 lbs. **119.95**

② Versatile combination Vectorscope/Color Generator

Accurately shows the chroma signal being fed to the CRT to indicate missing or weak colors, proper adjustment of the burst phase transformer, 3.58 MHz oscillator, reactance coil, bandpass transformer, color demodulation angle. Provides 12 patterns plus a raster for purity adjustments in 9x9 or 3x3.

Kit IO-4101, Shpg. wt. 13 lbs. **189.95**

Heathkit TV/radio test equipment gives you top quality

NEW

Get world-famous Heathkit reliability in a Yoke/Flyback Tester — and spend a lot less money — with the new portable IT-5235

$89⁹⁵

- Simple good/bad ring test checks yokes, flybacks and coils
- Quick, reliable measurement of drive signals in horizontal circuits
- Portable and lightweight with easy one-knob tuning

Why spend twice as much for a comparable model when you can get world-famous Heathkit quality at an affordable price? The new IT-5235 Yoke/Flyback Tester offers simple and reliable performance in a portable, lightweight package designed for TV service technicians.

A dynamic good/bad ring test checks horizontal and vertical windings of yokes, flybacks, horizontal linearity and efficiency coils and general mid-frequency (10 to 100 kHz) coils. Testing can be conducted in or out of circuit. You can get measurements of drive signals in horizontal circuits, as well
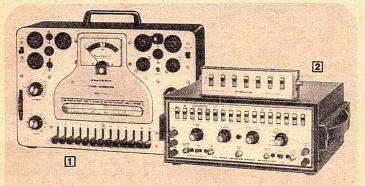
as focus and anode voltage measurements with the optional IMA-100-10 HV probe (listed below).

Use the IT-5235 on solid-state and tube-type TV's anywhere! It's lightweight (just 6 pounds) and portable, and can be operated on 110 or 240 VAC. One-knob tuning with color-coded controls, jacks and inputs provide easy, accurate measurements. Calibration requires only an oscilloscope. Test leads and convenient storage compartment included.

Kit IT-5235, Shpg. wt. 8 lbs. 89.95
Assembled ST-5235, Shpg. wt. 8 lbs. 130.00
High-Voltage Probe, IMA-100-11, 1 lb. 11.95

IT/ST-5235 SPECIFICATIONS: Yoke/Flyback Accuracy: ±1 ring at 10 mark on highest reading range. **Drive Voltage Scales:** 0-30 V P-P AC, 0-300 V P-P AC. **Drive Voltage Accuracy:** ±5% of full scale, 100 Hz to 200 kHz. **High-Voltage Scales:** 0-10 k VDC, 0-40 k VDC. **High-Voltage Accuracy:** ±3% of full scale (including optional IMA-100-10 HV probe). **Dimensions:** 6⅞" H x 5¾" W x 10¾" D.

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1 **Low-Cost Heathkit Tube Checker.** Essential for radio-TV servicing! Tests tubes on the basis of total emission, for shorts, leakage, open elements, and filament continuity. Has good/bad indicator to show relative quality, neon bulb indicator for filament continuity and leakage or shorts between elements.
Kit IT-3117, Shpg. wt. 12 lbs. 139.95

IT-3117 SPECIFICATIONS: Sockets: 4-pin, 5-pin, 6-pin combination and pilot light. 7-pin miniature, octal, loctal, 10-pin miniature, 9-pin novar, 9-pin miniature, 12-pin compactron, 5-pin nuvistor, 7-pin nuvistor. **Power Requirement:** 120 VAC, 50/60 Hz. **Dimensions:** 8½" H x 13" W x 5½" D.

2 **Deluxe Post Marker/Sweep Generator.** The IG-5257 makes receiver alignment fast and easy. It features 15 selectable markers, carrier markers for channels 4 and 10, a diode modulator for Video Sweep Modulation, a 400 Hz tone for FM receiver alignment. Compatible with NTSC system only.
Kit IG-5257, Shpg. wt. 16 lbs. 194.95

IG-5257 SPECIFICATIONS: Marker frequency: 100 kHz. Marker frequencies, crystal-controlled: 3.08, 3.68, 4.08, and 4.50 MHz ±0.01%. 10.7, 39.75, 41.25, 42.17, 42.50, 42.75, 45.00, 45.75, 47.25, ±0.005%; 67.25 and 193.25 MHz ±0.01%. **Modulation frequency:** 400 Hz. **Input impedance:** 75 ohms. Scope Vert. – 1 k ohms. **Bias voltage:** Positive or negative polarity. **Sweep frequency ranges:** LO Band – 2.5 to 5.5 MHz ±1 dB. IF Band – 39 to 49 MHz ±1 dB. RF band – 64 to 72 MHz ±1 dB. **Attenuator:** Total of 70 dB in seven steps.
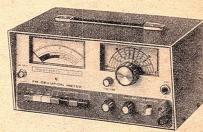
FM Deviation Meter helps check FM transmitters

$149⁹⁵ Kit

- Measures peak deviation of transmitters and signal generators
- Easy-to-read, easy-to-operate, accurate to ±3 percent
- Two front panel jacks for easy oscilloscope hookup

Measures peak FM deviation of transmitters and signal generators between 25 and 1000 MHz. Coarse and fine-tune controls for easy setup. Can be connected to a transmission line. Battery operated (batteries not included).
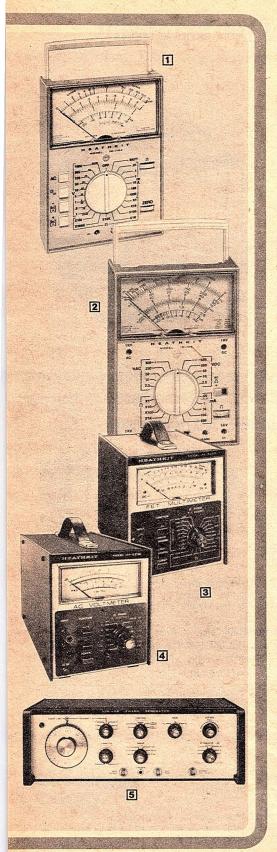
Kit IM-4180, Shpg. wt. 7 lbs. 149.95
Assembled and Tested SM-4180, Shpg. wt. 6 lbs. 250.00
Battery Charger/Eliminator, Kit IMA-4180-1, 2 lbs. 29.95
Assembled and Tested SMA-4180-1, Shpg. wt. 2 lbs. 40.00
Telescoping Antenna for IM-4180, SU-510, 1 lb. 9.95

IM/SM-4180 SPECIFICATIONS: Deviation Ranges: 0-2, 0-7.5, 0-20 and 0-75 kHz peak. **Accuracy:** ±3% of full scale. **Input Impedance:** 50 ohms. **Maximum Safe Input:** 5 volts. **Scope Output:** 13 mV/kHz peak. **Dimensions:** 5" H x 10⁵⁄₁₆" W x 7³⁄₁₆" D.

High-Voltage Probe Meter for fast, easy TV Tube Measurements

Makes TV high voltage measurements fast and convenient. It's lightweight, portable and measures DC voltages up to 40 kV with ±3% accuracy. Easy operation and assembly.
Kit IM-5210, Shpg. wt. 2 lbs. 19.95

Heathkit test instruments offer top

[1] Solid-state Taut-Band FET VOM. Provides the input characteristics and measuring capabilities of a VTVM with the versatility and portability of a VOM. The 4½" taut-band meter is diode-protected for outstanding ruggedness and reliability. Has 9 AC and DC voltage ranges; 6 current ranges; seven resistance ranges and 9 dB ranges. Extra-wide frequency response is useful for audio measurements.

Kit IM-1104, Shpg. wt. 4 lbs. **99.95**
Assembled SM-666. Has $1\mu A$ current range, less 100 mA and 1000 mA ranges. Shpg. wt. 3 lbs. **195.00**

IM-1104 SPECIFICATIONS: Frequency Response: 0.1 to 30 volt ranges, ±3%, 20 Hz to 20 kHz, ±5%, 20 to 50 kHz. 100-300 volt ranges, ±3%, 20 Hz to 10 kHz, ±5%, 20-Hz to 20 kHz. 1000 volt range, ±3%, 20 Hz to 1 kHz. **DC VOLTAGE RANGES:** 0.1, 0.3, 1, 3, 10, 30, 100, 300, 1000 V. **Accuracy:** ±2% of full scale. **AC VOLTAGE RANGES:** 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, 1000 V. **Accuracy:** ±3% full scale. **DC MILLIAMETER:** 0-0.1, 0.1, 1, 10, 100, 1000 mA. **Accuracy:** ±2% to 100 mA, ±3% to 1000 mA. **AC MILLIAMETER:** Same as DC mA; accuracy, ±3% to 100 mA; ±4% to 1000 mA. **OHMMETER:** Rx10, Rx100, Rx1000, Rx10K, Rx100K, (10 ohm center scale). Rx1M (10 megohm center scale) **dB:** (0 dB = 1 mW into 600 ohms) −40 to −18, −30 to −8, −20 to +2, −10 to +12, 0 to +22, +10 to +22, +20 to +42, +30 to +52, +40 to +62. **Operating Temperature:** 0 to 50°C. **Batteries** (not supplied): one 1.5 V D-cell (NEDA #13); four 1.5 V AA cells (NEDA #15). **Dimensions:** 6.95" H x 4.95" W x 2.25" D.

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[2] General-purpose VOM for easy service. The IM-105 is a high-accuracy VOM that's really designed to take it. Features low-friction, taut-band meter with diode and fuse protected movement. Calibrating controls, DC polarity reversal switch, front panel thumbwheel adjustment for ohms measurement plus a strong, truly "droppable" case. Less batteries.

Kit IM-105, Shpg. wt. 3 lbs. **79.95**
Assembled SM-660, (less 5 KV ranges), 3 lbs. . .**100.00**

IM-105 SPECIFICATIONS: DC VOLTAGE RANGES: −0.25, 2.5, 10, 50, 250, 500, 1000 & 5000 V full scale. **Accuracy:** ±3% of full scale. **Input resistance:** 20,000 ohms/V full scale. **AC VOLTAGE RANGES:** −2.5, 10, 50, 250, 500 V, 1 kV & 5 kV full scale. **Accuracy:** ±4% of full scale. **Input resistance:** 5000 ohms/V. **Input capacity:** Less than 20 pF. **Frequency response:** −2.5, 10, and 50 V ranges: ±5%, 10 Hz to 100 kHz; 250, 500 V ranges: ±5%, 10 Hz. **DC CURRENT RANGES:** −0.05, 1.0, 10, 100, 500 mA & 10 A full scale. **Accuracy:** ±3% of full scale. **RESISTANCE RANGES:** −x1 (20 center scale), x10, x100, x1k, x10k. **Accuracy:** ±3 degrees of arc. **DECIBEL RANGES:** (0 dB = 1 mW in 600 ohms). −10 to +56 dB. **Dimensions:** 7" H x 5" W x 2¼" D.

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[3] Quality FET Multimeter. Measures AC and DC volts, current and resistance. Features auto-polarity for added convenience, high and low voltage/ohms functions for in and out of circuit checks of semiconductor devices and resistance measurements, 4-position pushbutton switches.

Kit IM-5225, Shpg. wt. 8 lbs. **99.95**

IM-5225 SPECIFICATIONS: DC Volts: nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 full-scale. **AC Volts:** nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 volts full-scale. **DC Current:** six ranges 0-.01, 0.1, 1, 10, 100, 1000 milliamperes full-scale. **AC Current:** six ranges 0-.01, 0.1, 1, 10, 100, 1000 milliamperes full-scale. **Ohms:** seven ranges X1, X10, X100, X10k, X100k, X1M. **Power Requirement:** 120/240 VAC, 50/60 Hz, 5 watts. **Dimensions:** 6⅞" H x 5¾" W x 11¼" D. **Weight:** 5¾ lbs.

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[4] Deluxe AC Voltmeter. Has excellent frequency response and sensitivity high-accuracy measurements. And it's one of the only instruments around to feature linear scales for both volts and decibels!

Kit IM-5238, Shpg. wt. 8 lbs. **89.95**
Assembled SM-5238, Shpg. wt. 8 lbs. **160.00**

IM/SM-5238 SPECIFICATIONS: Voltage Range (full scale): 1 millivolt to 300 volts AC, 12 ranges. **Decibel Range:** −70 dB to +40 dB, 12 ranges in 10 dB steps with variable offset. **Input:** 10 megohms, 30 pF, negative input grounded to chassis. **Frequency Response: Voltage Range,** 10 Hz to 1 MHz, ±2 dB. 10 Hz to 500 kHz ±1 dB, **dB range,** 10 Hz to 250 kHz ±1 dB. **Outputs:** DC (proportional to input volts), 1 volt full scale. DC (proportional to log of input volts), 3 volts full scale. AC (amplified output), 1 volt peak, full scale. **Scales:** 0-10 volts; 0-3.16 volts; −20 to +10 dB. **Accuracy: Voltage Ranges,** 4% of full scale at 1 kHz plus accuracy of calibration standard. dB ranges, ±0.5 dB at 1 kHz plus accuracy of calibration standard. **Power Requirement:** 100-135 VAC, 200-270 VAC, 50/60 Hz, 20 watts. **Dimensions:** 6¾" H x 5⅝" W x 10⅞" D.

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[5] Lin/Log Swept Function Generator. The IG-1275 is a reliable lab-grade function generator that provides sine, square and triangle waveforms PLUS swept-function waveforms for convenient frequency response tests. This Lin/Log Swept Function Generator also has pen lift and chart control signals, for use with Heathkit chart recorders and others. The IG-1275 provides a 50 dB switch attenuator, variable between ranges, adjustable symmetry from 5 percent to 95 percent, and analog, sweep and sweep gate outputs for convenient system control. Start and stop frequencies are set independently; sweep modes can also be triggered externally.

Kit IG-1275, Shpg. wt. 15 lbs. **319.95**

IG/SG-1275 SPECIFICATIONS: Output: 50-ohm source — short circuit protected. ±10 volts open circuit. ±5 volts into 50-ohm load. **Output Flatness:** ±0.1 dB to 300 kHz. ±0.5 dB to 3 MHz. **Frequency:** 0.003 Hz through 3 MHz in 6 range steps on primary decade. **Sine Distortion:** Less than 1%, ×10¹. Less than 0.5%, ×10², 10³, 10⁴. Less than 0.75%, ×10⁵. Harmonics 30 dB down ×10⁴. **Triangle Linearity:** No deviation greater than 1% to 300 kHz. **Square-Wave Rise and Fall:** Less than 60 nS. **Sweep Generator:** 6 ranges, 10 μs through 100 sec. **Sweep Output:** Supplies 0 to 4.5-volt linear ramp at sweep generator rate from a 1000-ohm source. **Power Requirement:** 100 to 135 volts, 50-60 Hz, 20 watts maximum. (200 to 270 volts, 50-60 Hz, switch selectable.) **Dimensions:** 5⅜" H x 15" W x 11⅞" D.

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*Applicable only on top decade of each frequency range. The IG-1275 requires a triggered sweep oscilloscope for calibration.

- **Easy to Operate** front panel controls
- **Short-circuit-proof output amplifier**
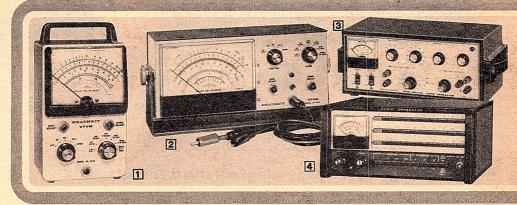- **Rugged case with carrying handle**

performance, high reliability and build-it-yourself value

[1] Popular, low cost VTVM. A single test probe that makes all measurements; seven practical AC, DC volts and ohms ranges; a precision 4½" color-coded 200 μA meter. 1% precision network resistors provide excellent accuracy; wide ±1 db, 25 Hz to 1 MHz frequency response permits a variety of AC measurements, Measures both rms and p-p AC volts. Separate full-scale ranges for 1.5 and 5 volts makes low-voltage readings really easy, ideal for work with solid-state and latest digital equipment. Can be wired for 120 or 240 VAC.

Kit IM-5218, Shpg. wt. 5 lbs. **49.95**
Assembled SM-5218, Shpg. wt. 5 lbs. **95.00**

IM/SM-5218 SPECIFICATIONS: Meter Scales: DC & AC (rms): 0-1.5, 15, 50, 150, 500, 1500 V full scale. **AC peak-to-peak:** 0.4, 14, 40, 140, 1400, 4000 V full scale. **Resistance:** 10 ohm center scale x1, x10, x100, x1000, x10k, x100k, x1 meg. Measures 1 ohm to 100 megohms. **Meter:** 4½", 200 μA movement. **Input resistance:** 11 megohms (1 megohm in probe) on all DC ranges; 1 megohm shunted by 35 pF on all AC ranges. **Circuit:** Balanced bridge (push-pull) using twin triode. **Accuracy:** DC ±3%, AC ±5% of full scale. **Frequency response:** ±1 dB, 25 Hz to 1 MHz (600 ohm source). **Battery Requirements:** 1.5 V, size "C" cell (not supplied). **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 7⅜" H x 4¹¹/₁₆" W x 4¼" D.

[2] Pro-feature bench VTVM. Bench-type version of IM-5218. All calibration controls are conveniently adjustable from the front panel. 120 or 240 VAC.

Kit IM-5228, Shpg. wt. 6 lbs. **59.95**
Assembled SM-5228, Shpg. wt. 7 lbs. **120.00**

IM/SM-5228 SPECIFICATIONS: DC VOLTMETER — Ranges: 0-1.5, 5, 15, 50, 150, 500, 1500 volt scales; up to 30,000 V with accessory probe. **Input Resistance:** 11 megohm (1 megohm in probe) on all ranges: 1100 megohms with accessory probe. **Circuit:** Balanced bridge (push-pull) using twin triode. **Accuracy:** ±3% of full scale. **AC VOLTMETER — Ranges:** 0-1.5, 5, 15, 50, 150, 500, 1500 rms scales. **Frequency Response (5 V range):** ±1 dB 25 Hz to 1 MHz (800 ohm source, referred to 60 Hz). **Accuracy:** 5% of full scale. **Input Resistance & Capacitance:** 1 megohm shunted by 40 pF measured at input terminals (200 pF at probe tip). **OHMMETER — Ranges:** Scale with 10 ohm center, X1, X10, X100, X1000, X10K, X1 meg. Measures 0.1 ohm to 1000 megohms with internal battery. **Meter:** 6", 200 μA movement, polystyrene case. **Battery:** 1½V, "C" cell (not supplied). **Power Requirement:** 120/240 VAC, 60/50 Hz, 10 W. **Dimensions:** 5" H x 12¹¹/₁₆" W x 4¾" D.

[3] Sine-square wave Audio Generator. Ideal for gain and frequency response measurements in audio amplifiers, as a signal source for harmonic distortion measurements or as an external modulator for RF signal generators. A meter, calibrated in both volts and dB, monitors the sine wave output.

Kit IG-5218, Shpg. wt. 10 lbs. **94.95**
Assembled SG-5218, 10 lbs. **185.00**

IG/SG-5218 SPECIFICATIONS: Frequency Range: 1 Hz to 100 kHz. **Sine Wave Output: Output voltage:** 8 ranges, 0.003 to 10 V rms (full-scale) with 10 k ohm or higher external load. 6 ranges, 0.003 to 1 V (full-scale) with 600 ohm internal or external load. **dB ranges:** −62 dB to +22 dB, −12 dB to +20 dB on amplitude switch in 10 dB steps. +2 dB max. into 600 ohm load. (0 dB = 1 mW in 600 ohm). **Output variation:** +1 dB 10 Hz to 100 Hz. **Output impedance:** 10 V range: 0-1000 ohm, 3 V range: 800-1000 ohm; 1 V range and lower; 600 ohm. **Square Wave Output: Output voltage (peak-to-peak).** 0-1; 1, 10 V into 2000 ohm load or higher. **Output impedance:** 0.1 and 1 V ranges: 52 ohm; 10 range: up to 220 ohm. **Power Requirement:** 105-125 or 210-250 VAC, 60/50 Hz, 6 watts. **Dimensions:** 5⅛" H x 13¼" W x 7" D.

PKW-4, Wired Replacement Probe for IM-5228, 5218, 18 or 28. Wt. 1 lb. **10.95**
Convert your IM-5228, 5218, 18 or 28 to instant-on solid-state operation.
IMA-18-1, Wt. 1 lb. **19.95**

[4] IG-1272 Audio Frequency Generator. The Heathkit IG-1272 provides a low-distortion sine wave output over a frequency range from less than 5 Hz to 100 kHz. Pushbutton select first 3 significant digits of desired frequency; also control frequency multiplier. Perfect for the serious audiophile, audio service shop or audio designer.

Kit IG-1272, Shpg. wt. 11 lbs. **139.95**
Assembled SG-1272, 10 lbs. **170.00**

IG/SG-1272 SPECIFICATIONS: Output Voltage: 0.003 to 10 volts RMS. **Output Load:** 600 ohms. **Hum and Noise:** 0.01% or less. **Frequency Accuracy:** Pushbuttons; ±4%, typical ±1.5%. Variable; Depends on accuracy of counter being used. **Attenuation:** 10 to 70 dB. **Power Requirement:** 120 VAC or 240 VAC, 50 or 60 Hz. 10 watts maximum. **Dimensions:** 5½" H x 11" W x 12⅓" D.

Versatile, low-cost Heathkit 1 Hz-1 MHz Function Generator

Generates highly accurate sine, square or triangle waveforms over a frequency range of 1 Hz to 1 MHz. The frequency multiplier and front panel tuning control set any frequency fast and easy. The output amplifier supplies a 10 volt (p-p) signal into a 50 ohm load. A calibrated step attenuator adjusts from 0 to 50 dB (10V p-p to 30 mV p-p) in 10 dB steps. An attenuator control provides up to 20 dB additional attenuation. A trigged scope is necessary for calibration.

Kit IG-1271, Shpg. wt. 7 lbs. **119.95**
Assembled SG-1271, wired version of the IG-1271. 7 lbs. **185.00**

IG-1271 SPECIFICATIONS: Frequency range: 1 Hz to 1 MHz. **Frequency accuracy:** ±3% of full scale on dial. **Functions: Triangle waveform:** Nonlinearity, 5% maximum. Symmetry within 10% of 50% duty cycle. **Square waveform:** 100 nanosecond maximum rise or fall time. Symmetry within 10% of 50% duty cycle. **Sine waveform:** Harmonic distortion; 3% max., 5 Hz to 100 kHz. **Attenuator:** 0 to 50 dB in 10 dB steps. 0 to 20 dB minimum variable, ±1 dB accuracy. **Output:** 10 volts peak-to-peak into 50 ohms. ±1.5 dB flatness from 0.1 Hz to 1 MHz. 50 ohms impedance ±5%. **Power requirement:** 105-130 volts or 210-260 volts, rms, 60/50 Hz. 15 watts max. **Operating temperature:** 0 to 40°C. **Dimensions:** 3" H x 7¼" W x 8⅞" D (with handle removed). **Net weight:** 4.2 lbs.

Solid-State portable VOM is ideal for fast, in-the-field checks

$44⁹⁵

- Value-priced
- Easy-to-build
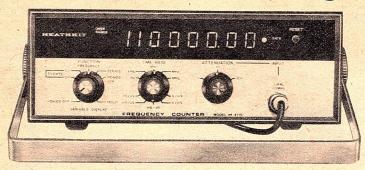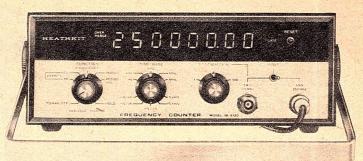
Our lowest-priced portable VOM is ideal for car buffs, boaters, campers — any away-from-the-bench situation. Has four AC, DC and ohms ranges for most common measurements, high impedance to minimize circuit loading, wide frequency response for audio measurements. A special 1½-volt ohmmeter is ideal for checking semiconductors. Function switch gives you both AC and DC readings without changing test lead connections. Less batteries.

Kit IM-5217, Shpg. wt. 4 lbs. **44.95**

IM-5217 SPECIFICATIONS: DC VOLTMETER: Ranges: 0-1.5, 0-15, 0-150, 0-500 volts full scale. **Input Resistance:** 10 megohms on all ranges. **Accuracy:** ±3% full scale. **AC VOLTMETER: Ranges:** 0-1.7, 0-15, 0-150, 0-500 volts full scale. **Input Resistance:** 1 megohm on all ranges. **Input Capacitance:** approx. 100 pF (40 pF on 500-volt range). **Accuracy:** ±5% full scale. **Frequency Response:** 1 dB, 10 Hz to 1 MHz. **OHMMETER:** Rx1, Rx100, Rx10K, Rx1M (10 ohms center scale). **Meter:** 4½", 100 μA, 100 degree movement. **Batteries:** (not supplied): two 9-volt, one 1.5 V "C" cell. **Dimensions:** 5⅜" H x 9⅜" W x 9" D.

High-performance, budget-minded frequency counters

Heathkit Deluxe Frequency Counters — packed with extra features for value!

These Heathkit Frequency Counters give you the accuracy and reliability you need — plus features you just won't find on other counters in their price ranges. Features like a switchable attenuator on the 110 MHz input to divide the input signal x1, x10 or x100 to accurately measure high-amplitude signals. Or a time base switch to select the gate time and the resolution of the display. The IM-4120 time base is controlled by a high-quality TCXO (temperature-controlled crystal oscillator) with a temperature stability of ±1 part per million and an aging rate of 5 parts per million per year for excellent stability. The IM-4110's crystal oscillator has a temperature stability of ±10 parts per million and an aging rate of 10 parts per million per year. To maintain a low VSWR (voltage standing wave ratio), separate 50-ohm inputs are used for frequency ranges above 110 MHz, while inputs in frequency ranges below 110 MHz are 1 megohm shunted by less than 25 pF. To connect an external time base, there's a rear panel oscillator input/output jack.

Both counters include additional functions — events, period and period averaging.

The counters also feature rugged metal cases with non-marring front panels and a 12-position handle which rotates a full 360 degrees for easy storage and handling. The frequency counter circuitry can operate completely free of the metal case, which makes servicing your counter much easier. And you can calibrate your counter without instruments!

Kit assembly is easy, with a Heathkit construction manual to guide you every step of the way. And there's no better way to learn how to service your counter (and save on service costs) than building it yourself!

The counters operate on 120 or 240 VAC, 50/60 Hz (switch-selectable), 12 VDC (with optional IMA-4130-1 12-Volt Converter below) or 12 optional SMA-4130-2 rechargeable nickel-cadmium batteries (order below; can be recharged by optional IMA-4130-1 12-Volt Converter). Cables are not included with counter.

5 Hz to 110 MHz Frequency Counter. Applications include CB radio, low-band AM and FM radio, AM and FM broadcast bands, crystals, video tape systems, musical instruments and much more. Accepts any input between 5 Hz and 110 MHz.

Kit IM-4110, Shpg. wt. 12 lbs. **199.95**

5 Hz to 250 MHz Frequency Counter. Same applications as IM-4110, plus marine and aircraft radios, 2-meter FM radio, 220 MHz FM radio, general laboratory and research work, and much more. Accepts inputs from 5 Hz to 110 MHz, and from 5 MHz to 250 MHz. Withstands 25 Vrms.

Kit IM-4120, Shpg. wt. 12 lbs. **299.95**
Assembled SM-4120, Shpg. wt. 10 lbs. **480.00**
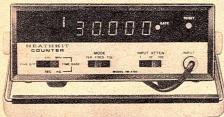
	IM-4110	IM-4120
Frequency Range	5 Hz to 110 MHz	5 Hz to 250 MHz
Inputs	5 Hz to 110 MHz	5 Hz to 110 MHz / 5 MHz to 250 MHz
Input Sensitivity	25 mV RMS	25 mV RMS
Input Impedance	1 meg shunted by <25 pF	50 ohms, VSWR less than 1.5:1 at 110 MHz
Protection	250 V (DC + peak AC) to 100 kHz	5 Vrms
Time Base Freq.	10 MHz	4 MHz TCXO
Aging Rate	<10 ppm/yr	<5 ppm/yr
Temp. Stability (0 to 40°C ambient)	±10 ppm	±1 ppm

OTHER SPECIFICATIONS: FUNCTIONS: Events: 1 to 99,-999,999. **Period Resolution:** 0.1 μS. **Period Average:** 1,000 periods. **Period Pulse Width:** 100 nS minimum. **Low Frequency Signal Risetime:** 1 mS to signals less than 10 Hz. **OSCILLATOR CONNECTION: External Input Frequency:** 1 MHz. **Sensitivity:** TTL or 2.5 Vrms for 50-ohm source. **Protection:** −5 V peak to +10 V peak. **Internal Output:** >1.5 V p-p into 50 ohms at 1 MHz. **GATE INTERVAL: Frequency:** 1 mS to 10 S. **Period:** determined by period of input frequency. **Power Requirement:** 105-130 VAC or 210-260 VAC (switch-selectable), 50-60 Hz, 35 watts; or 9-14 VDC at 2.5 A max. **Dimensions:** 4″ H x 10¼″ W x 13¼″ D (less handle).

12-Volt Converter for IM-4110 and IM-4120 Counters. Mounts inside counter cabinet, allows counter to operate from a 12 VDC source to facilitate mobile operation. Can also be fitted with 12 optional SMA-4130-2 rechargeable nickel-cadmium batteries (order below).
Kit IMA-4130-1, Shpg. wt. 3 lbs. **29.95**

Set of 12 rechargeable nickel-cadmium batteries. Powers IM-4110 and IM-4120 Frequency Counters for portable use. Recharge with optional IMA-4130-1 12-Volt Converter (above).
SMA-4130-2, Shpg. wt. 4 lbs. **89.95**

Our compact, lowest-priced Frequency Counter gives you top value and performance

$99⁹⁵ Kit

- Full five-digit frequency counter
- Built-in input attenuation
- Internal or external time bases

The Heathkit IM-4100 gives you almost unbelievable value in a low-priced frequency counter. It's a full five-digit counter that also functions in period and totalize modes. And it provides built-in input attenuation and 12-volt operation.

The front panel attenuator switch allows the amplitude of input signals to be divided by 1,10 or 100. A reset switch quickly resets to zero.

A rear panel switch easily selects internal or external time base. The rear panel connector can be used as an input for an external time base signal and for frequency ratio measurements. Display includes overrange indicator and gate lamp. The IM-4100 operates on 120/240 VAC, or 12 VDC (mating connector supplied). Cables not included.

Kit IM-4100, Shpg. wt. 6 lbs. **99.95**
Assembled SM-4100, Shpg. wt. 6 lbs. **180.00**

IM-4100 SPECIFICATIONS: Sensitivity: 20 mVrms (50 mV, 5 Hz to 50 Hz). **Risetime:** 1 mS for signals less than 10 Hz. **Input Impedance:** 1 megohm shunted by less than 35 pF. **Protection:** 240 Vrms at 60 Hz. **TIME BASE: Frequency:** 10 MHz. **Stability:** ±10 ppm, maximum, 0° to 40°C ambient. **OSCILLATOR CONNECTION: External Input Frequency:** DC to 20 MHz. **Dimensions:** 2¾″ H x 7¼″ W x 10½″ D (less handle).

Telescoping Antenna for no-hookup counting
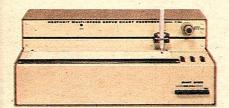
Hooks up to Heathkit 4100-series frequency counters to determine frequencies without direct connection to the unit(s) being tested. For any device where direct counter connection is either inconvenient or inaccessible.
SU-510, Shpg. wt. 1 lb. **9.95**

Economical, easy-to-use, precision Heathkit test equipment

High-precision X-Y Chart Recorder gives you extra versatility, extra accuracy for the most demanding uses

- Complete front panel controls for ease of operation
- Adjustable line frequency filtration
- Accurate to ±0.5 percent of full scale
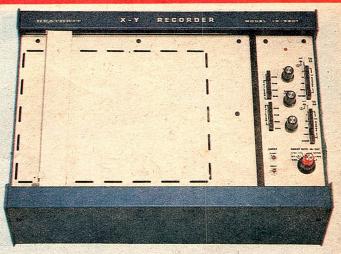- Electric pen lift to zero coordinates

$479⁹⁵ Kit

Low-priced, accurate and durable Heathkit Strip Chart Recorder

Functional styling and modern design make the IR-18M easy to use. Features 1 mV or 10 mV full-scale input (selected during assembly), twelve chart speeds from 5 sec./in. to 200 min./in. Accurate to ±0.5 percent of full scale. Zener diode-regulated voltage supply. Power, servo and chart switches, coarse and fine zero controls, high impedance floating input. Less than 1 percent error, full scale. For 120/240 VAC, 50/60 Hz. Dimensions, 6" H x 15" W x 9⅛" D.

Kit IR-18M, Shpg. wt. 15 lbs. 229.95
Three 140 ft. rolls chart paper.
IRA-18-1, Shpg. wt. 5 lbs. 12.95

The easy-to-use IR-5207 Chart Recorder is precise enough for your most demanding measurements. Precise to ±0.5 percent of full scale (dead band and non-linearity error is less than 0.25 percent of full scale.)

The IR-5207 is easy to set up and operate. Complete front panel controls assure you of easy-operating convenience in any application. Front panel input filters with pushbutton controls let you tailor filtering to your exact requirements. The integral paper holddown can be used in both horizontal and vertical positions without modification, and it can use any type of special application paper that fits the graph table. Calibrated ranges of 1, 10, 100 mV and 1 V per inch are selectable from the front panel. And you can go from 1 mV per inch to 10 V per inch in the variable mode. Electric pen lift lets you place pen anywhere on the chart with zero input on both coordinates. The IR-5207 — versatile enough to help you in almost any chart recording application.

Kit IR-5207, Shpg. wt. 28 lbs. 479.95
Factory assembled and tested version of IR-5207.
SR-207, Shpg. wt. 30 lbs. 960.00
SU-205-6, Disposable Red Nylon Tip Pen for chart speeds under 1 in./min. Shpg. wt. 1 lb. 3.00
SU-205-7, Disposable Blue Nylon Tip Pen for chart speeds over 1 in./min. Shpg. wt. 1 lb. 3.00

IR-5207 SPECIFICATIONS: MECHANICAL: Chart Size: 8½" x 11" (21.59 cm x 27.94 cm). **Sweep Speeds:** 0.02, 0.1, 0.2, 1 and 2 in./S (0.04, 0.2, 0.4, 2 and 4 cm/S). **Balance Time:** <1 second for full-scale deflection. **Overshoot:** <1% of full scale. **ELECTRICAL: Range:** 1, 10, 100 mV/ in., 1 V/in. (0.5, 5, 50, 500 mV/cm) calibrated, 1 mV/in. to 10 V/in. (0.5 mV/cm to 5 V/cm) variable. **Zero Control Range:** Pen may be placed anywhere on chart with zero input to both coordinates. **INPUT CHARACTERISTICS: Type:** Single ended, independently floating. **Maximum Common Mode Input Voltage:** 400 V. **Ambient Temperature:** 10° to 40°C. **Power Requirements:** 120/240 VAC, 50-60 Hz, 35 watts maximum. **Dimensions:** 5⅝" H x 17⅝" W x 12¼" D.

Professional-quality Harmonic and Intermodulation Distortion Analyzers

Harmonic Distortion Analyzer. The Heathkit IM-5258 Harmonic Distortion Analyzer is a professional-grade total harmonic distortion (THD) analyzer. Its outstanding sensitivity and bandwidth let you measure total harmonic distortion at levels as low as 0.03 percent, from 5 Hz to 100 kHz (in five ranges), with 5 percent full scale accuracy. The IM-5258 can also function as an AC voltmeter, with 12 switch-selected ranges from 1 mV to 300 V full scale. And the IM-5258 has a dB scale. Not for use in strong RF fields. For 120/240 VAC, 50/60 Hz.

Dimensions, 5⅜" H x 15" W x 11½" D (13.6 cm H x 38.1 cm W x 29.2 cm D).
Kit IM-5258, Shpg. wt. 17 lbs. 229.95

Intermodulation Distortion Analyzer (not pictured). Designed for professional-quality audio servicing and testing, the IM-5248 Intermodulation Distortion Analyzer is similar to the IM-5258 Harmonic Distortion Analyzer (described at left), except the IM-5248 measures Intermodulation Distortion (IMD). Excellent sensitivity (10 mV to 300 V in a 1-3-10 sequence) means you can measure almost any level of IMD — down to 0.01 percent. Also features built-in AC voltmeter and dB measurement capability. Not for use in strong RF fields. For 120/240 VAC, 50/60 Hz.

Kit IM-5248, Shpg. wt. 14 lbs. 119.95
Factory assembled and tested version of above.
SM-5248, Shpg. wt. 15 lbs. 190.00

Rugged Bi-Directional Wattmeter

$109⁹⁵ Kit

Covers 100 MHz to 1 GHz without costly elements or slugs; Ideal for servicing.

The Heathkit IM-4190 is ideal for use in repairing and servicing two-way radios, VHF and UHF communications equipment. This rugged meter measures forward and reflected power in transmission lines between 100 MHz and 1 GHz. Easy-to-read front panel meter, N-type coax connectors for easy hookup, N to PL-259 adapters. Requires 9-volt battery (not included).

Kit IM-4190, Shpg. wt. 3 lbs. 109.95
Factory assembled and tested version.
SM-4190, Shpg. wt. 3 lbs. 140.00

65

High-accuracy 3½-digit auto-ranging Multimeter

$289.95

- Automatically selects proper voltage, current or resistance range for easier, more accurate measurements
- Bright, easy-to-read 3½-digit display
- Input protection on all functions prevents overloads
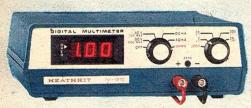
The IM-2212 is a laboratory-grade instrument featuring automatic range selection along with exceptionally high accuracy. It features five AC and DC voltage ranges to 1000 volts; five AC and DC current ranges to 2000 mA; and ten resistance ranges (low-voltage and high-voltage) up to 20 megohm. Basic DC accuracy is ±0.2%; Basic AC accuracy is ±0.4% when calibrated to laboratory standards. Has automatic polarity indication, automatic decimal point placement, automatic k-ohms or megohms indication. Normal mode rejection of 80 dB assures highly stable DC readings. A hold switch inhibits the auto-ranging function when measuring one range. Operates on 120/240 VAC, or with optional battery pack (order below). Compact low-profile cabinet with detent positions to hold the IM-2212 at the best viewing angle.

Kit IM-2212, Shpg. wt. 10 lbs. 289.95
IMA-2212-1, Optional Rechargeable Battery Pack for in-field use. Shpg. wt. 4 lbs. 39.95

IM-2212 SPECIFICATIONS: DC Voltage Ranges: 0-0.2-2.0-20-200-2000. Maximum input: 1000 VDC on any range. Input Resistance: 10 megohm on all ranges. Accuracy: ±[0.05% (.50%*) of reading, +0.10% of range]. AC Voltage Ranges: 0.2-2.0-20-200-2000. Maximum Input: 700 VAC (1000 volts peak) on any range. Accuracy (40 Hz to 10 kHz): ±[0.25% (1.0%*) of reading, +0.15% of range]. Input Impedance: 10 meg shunted by 90 pF on all ranges. DC mA Ranges: 0.2-2.0-20-200-2000. Accuracy: ±[0.15% (.50%*) of reading +0.10% of range]. AC mA Ranges: 0.2-2.0-20-200-2000. Accuracy (40 Hz to 10 kHz): ±[0.30% (1.0%*) of reading +0.15% of range]. Ohmmeter Ranges: Low-voltage, 0.2K-2.0K-20K-200K-2 meg. High-voltage 2.0K-20K-200K-2.0 meg-20 meg. Overvoltage protection: 350 VDC (250 VAC) on all ranges. Accuracy: ±[0.10% (.50%*) of reading +0.10% of range]. Display: 3½-digit (1999 maximum count), 0.5", 7-segment planar LED. Polarity Indication: Automatic + or − on VDC and mA DC range only. Display Rate: 3⅓ per second. Overrange Indication: flashing display on highest range, or when using RANGE HOLD switch. Power Line Isolation: COM input may be floated 500 VDC/350 VAC from ground. Battery Operating Time: (with optional IMA-2212-1 battery pack) 5 hours typ., 4 hours minimum after 16-hour charge period with unit off. Operating Temperature Range: Line operation, 10° C to 40° C (50° F to 104° F). Portable Operation: 20° C to 40° C (68° F to 104° F). Power Requirement: 100-135 VAC or 200-270 VAC (internally selectable); 50/60 Hz, 10 watts. Dimensions: 3.1" H x 7.5" W x 11" D. Net Weight: 6 lbs., 8 lbs. with battery pack installed.
*Numbers in parentheses indicate built-in specifications. Other numbers indicate laboratory standard specifications.

Our low cost, high performance Digital Multimeter

- Overload protection on all ranges
- 120 or 240 VAC operation

$67.95 Kit

Here's a low-cost, high performance DMM for hams, hobbyists and service techs. Its full-function capability includes AC voltage measurements up to 700 volts. Has four overlapping AC & DC voltage & current ranges and five resistance ranges. Features overload protection on all ranges, 120 or 240 VAC operation, isolated floating ground, attractive heavy-duty case to withstand rugged use, universal banana jack inputs for easy testing of electronic equipment.

Kit IM-1210, Shpg. wt. 5 lbs. 67.95
SM-1210, Factory assembled and calibrated, 5 lbs. 120.00

IM-1210 SPECIFICATIONS: Ranges: (Full-Scale): DC volts: 0-2, 20, 200, 1,000 V; DC current: 0-2, 20, 200, 2,000 mA; AC volts: 0-2, 20, 200, 700 V rms (50 Hz to 10 kHz). AC current: 0-2, 20, 200, 2,000 mA rms (60 Hz to 10 kHz). Ohms: 0-200, 2K, 20K, 200K, 2M ohms. Overrange: 25% on all functions, within maximum input limits. Maximum Input: 3 amperes into AC or DC mA, and Ohms (fuse protected.) 700 VAC rms into Volts (except 2V range.) 1000 VDC into Volts (except 2V range: 350 VDC.) "−" input may be floated 1000 VDC (700 VAC) above earth ground. Resolution (Low Range): Volts: 10 mV. Current: 10 µA. Ohms: 1 ohm. Accuracy (Full Scale, ±1 Digit): DC volts: ±1%. DC current: ±1.5%. AC volts: ±1.5%. AC current: ±2%. Ohms: ±1.5%. Input Impedance: 1 megohm on all voltage ranges. Power Requirement: 100-135 VAC, 200-270 VAC 50/60 Hz, 8 watts. Dimensions (overall): 3.00" H x 8.69" W x 10.54" D. Weight: 3.3 pounds (1.5 kg). NOTE: Specifications are based on 30-minute warmup.

Portable Digital Multimeter — ideal for in-the-field uses

$189.95

Lightweight, compact, highly accurate. Features 26 ranges — measures AC and DC volts, DC current and resistance. Has 100% overrange capability, separate voltage and current inputs for circuit protection. 2-volt full scale measurement on 1k, 10k and 1 meg ranges allow forward biased junction testing of semiconductor devices. Has 3½-digit display with leading zero suppression, automatic polarity indication and decimal placement.

Kit IM-2202, Shpg. wt. 8 lbs. 189.95

IM-2202 SPECIFICATIONS: DC VOLTAGE — Overload Capability: 300 V on 100 mV & 1V ranges; 1000 V on 10 V & 1000 V ranges. Accuracy: ±0.5%, ±1 digit. AC VOLTAGE — Overload Capability: 250 V on 100 mV & 1 V ranges; 750 V on 10 V, 100 V & 750 V ranges. Accuracy: ±1.5%, ±3 digits; 50 Hz to 1 kHz (except 50 Hz to 10 kHz on 100 mV and 1 V ranges). DC CURRENT — Range/Voltage Drop: 100.0 µA/100 mV, 1.000 mA/100 mV, 10.00 mA/100 mV/150 mV, 1000 mA/300 mV. Accuracy: ±0.5%, ±1 digit (except ±1%, ±1 digit on 1000 mA range). AC CURRENT — Range/Voltage Drop: 100 µA/100 mV, 1.000 mA/100 mV, 10.00 mA/100 mV, 100.0 mA/150 mV, 1000 mA/300 mV. Accuracy: ±1.0%, ±3 digits except ±1.5%, ±3 digits on 1000 mA range); 40 Hz to 10 kHz. RESISTANCE — Range/Test Current: 100.0 Ω/1.0 mA, 1.000 kΩ/1.0 mA, 10.00 kΩ/0.1 mA, 100.0 kΩ/1.0 µA, 1000 kΩ/0.10 µA. Accuracy: ±2%, ±1 digit. GENERAL — Normal Mode Rejection: 35 dB. Common Mode Rejection: 80 dB. Power Requirement: 110 to 130 VAC, or 220 to 260 VAC (internal selectable); 60/50 Hz; (Accuracy specs use built-in references.) Size 3" H x 8¼" W x 8" D.

Portable hand-held Multimeter

You get easy one-hand operation and top performance in a hand-held DMM that gives you more for your money

$94.95

- Measures AC and DC voltage, current and resistance
- Large, easy-to-read Liquid Crystal Display (LCD)
- Built-in references make in-the-field calibration easy

The features you need in a hand-held DMM, and a great low price, are yours in the IM-2215. Measures AC and DC voltage, AC and DC current and resistance. Special alternating high-to-low resistance test voltage make it ideal to test semiconductors and in-circuit resistance. The IM-2215 is great for in-field use — pushbutton switches permit easy one-hand operation, leaving your other hand free for probe placement — and calibration references are built-in. A pivoting stand is included to place the IM-2215 at a convenient angle for bench use.

The 3½-digit LCD features easy-to-read digits and automatic decimal point placement. Battery condition is continuously monitored and a "Lo-Bat" is displayed for the last 20% of battery life. And with the special low-drain circuitry, a typical 9-volt alkaline battery (not supplied) can last up to 200 hours! Easy one-evening assembly. Also operates on 120 or 240 VAC with optional cords (below).

IM-2215, Shpg. wt. 2 lbs. 94.95
Rugged Leather Carrying Case for IM-2215. Includes belt loop.
IMA-2215-1, Shpg. wt. 7 lbs. 14.95
PS-2350, 120 VAC Outlet Cord. Shpg. wt. 1 lb. 4.95
PS-2450, 220 VAC Outlet Cord. Shpg. wt. 1 lb. 14.95
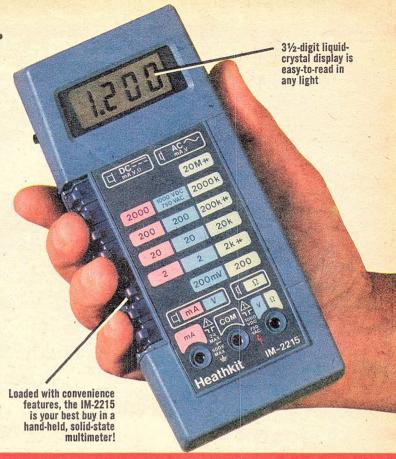
IM-2215 SPECIFICATIONS: DC VOLTAGE: Ranges: ±200 mV, ±2 V, ±20 V, ±200 V, ±1000 V. **Accuracy:** Lab standards, ±.25% of reading ±1 count. **AC VOLTAGE: Ranges:** 200 mV, 2 V, 20 V, 200 V, 750 Vrms. **Accuracy (50 and 60 Hz):** Lab standards, ±.5% of reading ±3 counts. **DC CURRENT: Ranges:** ±2 mA, ±20 mA, ±200 mA, ±2000 mA. **Accuracy:** ±.75% of reading ±1 count. **AC CURRENT: Ranges:** 2 mA, 20 mA, 200 mA, 2000 mA. **Accuracy:** ±1.5% of reading ±3 counts. **Frequency Response:** 2 mA range, 40 to 200 Hz; all other ranges, 40 Hz to 1 kHz. **RESISTANCE: Ranges:** 200 ohms, 2 kilohms, 20 kilohms, 200 kilohms, 2 megohms, 20 megohms. **Accuracy:** 200 ohm range, ±.3% of reading +3 counts; 20 megohms range, ±2% of reading +1 count; all other ranges, ±.25% of reading +1 count. **Dimensions:** 2" H x 3½" W x 7½" L.

3½-digit liquid-crystal display is easy-to-read in any light

Loaded with convenience features, the IM-2215 is your best buy in a hand-held, solid-state multimeter!

Informative books that will help you get more from your instruments

Understanding/Using Oscilloscopes. A helpful guide, covering functions, circuits and more.
EDP-139 ....5.95

101 Ways to Use Your Oscilloscope. Practical applications in troubleshooting and design work.
EDP-149 ....5.50

101 Ways to Use Your VOM/VTVM. Practical applications in an easy to understand text.
EDP-150 ....4.95

How to Use Color TV Test Instruments. Practical information on servicing color TV sets.
EDP-138 ....5.95

Visit your Heathkit Electronic Center (Units of Veritechnology Electronics Corporation) and see our complete product line.

Parts and service available. (Retail prices on some items may be slightly higher.)

ARIZONA — Phoenix, 85017
2727 W. Indian School Rd. 602-279-6247
CALIFORNIA — Anaheim, 92805
330 E. Ball Rd. 714-776-9420
El Cerrito, 94530
6000 Potrero Ave. 415-236-8870
Los Angeles, 90007
2309 S. Flower St. 213-749-0261
Pomona, 91767
1555 N. Orange Grove Ave. 714-623-3543
Redwood City, 94063
2001 Middlefield Rd. 415-365-8155
Sacramento, 95825
1860 Fulton Ave. 916-486-1575
San Diego (La Mesa, 92041)
8363 Center Dr. 714-461-0110
San Jose (Campbell, 95008)
2350 S. Bascom Ave. 408-377-8920
Woodland Hills, 91364
22504 Ventura Blvd. 213-883-0531
COLORADO — Denver, 80212
5940 W. 38th Ave. 303-422-3408

CONNECTICUT — Hartford (Avon, 06001)
395 W. Main St. (Rte. 44) 203-678-0323
FLORIDA — Miami (Hialeah, 33012)
4705 W. 16th Ave. 305-823-2280
Tampa, 33614
4019 West Hillsborough Ave. 813-886-2541
GEORGIA — Atlanta, 30342
5285 Roswell Rd. 404-252-4341
ILLINOIS — Chicago, 60645
3462-66 W. Devon Ave. 312-583-3920
Chicago (Downers Grove, 60515)
224 Ogden Ave. 312-852-1304
INDIANA — Indianapolis, 46220
2112 E. 62nd St. 317-257-4321
KANSAS — Kansas City (Mission, 66202)
5960 Lamar Ave. 913-362-4486
KENTUCKY — Louisville, 40243
12401 Shelbyville Rd. 502-245-7811
LOUISIANA — New Orleans (Kenner, 70062)
1900 Veterans Memorial Hwy. 504-467-6321
MARYLAND — Baltimore, 21234
1713 E. Joppa Rd. 301-661-4446
Rockville, 20852
5542 Nicholson Lane 301-881-5420
MASSACHUSETTS — Boston (Peabody, 01960)
242 Andover St. 617-531-9330
Boston (Wellesley, 02181)
165 Worcester Ave.
(Rt. 9 just west of Rt. 128) 617-237-1510

MICHIGAN — Detroit, 48219
18645 W. Eight Mile Rd. 313-535-6480
E. Detroit, 48021
18149 E. Eight Mile Rd. 313-772-0416
MINNESOTA — Minneapolis (Hopkins, 55343)
101 Shady Oak Rd. 612-938-6371
St. Paul, 55106
1645 White Bear Ave. 612-778-1211
MISSOURI — St. Louis (Bridgeton) 63044
3794 McKelvey Rd. 314-291-1850
NEBRASKA — Omaha, 68134
9207 Maple St. 402-391-2071
NEW JERSEY — Fair Lawn, 07410
35-07 Broadway (Rte. 4) 201-791-6935
Ocean, 07712
1013 State Hwy. 35, 201-775-1231
NEW YORK — Buffalo (Amherst, 14226)
3476 Sheridan Dr. 716-835-3090
Jericho, Long Island, 11753
15 Jericho Turnpike 516-334-8181
Rochester, 14623
937 Jefferson Rd. 716-424-2560
White Plains
(North White Plains, 10603)
7 Reservoir Rd. 914-761-7690
OHIO — Cincinnati (Woodlawn, 45215)
10133 Springfield Pike 513-771-8850
Cleveland, 44122
28100 Chagrin Blvd. 216-292-7553

Columbus, 43229
2500 Morse Rd. 614-475-7200
Toledo, 43615
48 S. Byrne Rd. 419-537-1887
OKLAHOMA — Oklahoma City, 73112
2727 Northwest Expressway, 405-848-7593
PENNSYLVANIA — Philadelphia, 19149
6318 Roosevelt Blvd. 215-288-0180
Frazer (Chester Co.), 19355
630 Lancaster Pike (Rt. 30) 215-647-5555
Pittsburgh, 15235
3482 Wm. Penn Hwy. 412-824-3564
RHODE ISLAND — Providence (Warwick, 02886)
558 Greenwich Ave. 401-738-5150
TEXAS — Dallas, 75201
2715 Ross Ave. 214-826-4053
Houston, 77027
3705 Westheimer 713-623-2090
San Antonio, 78216
7111 Blanco Road 512-341-8876
UTAH — Salt Lake City (Midvale, 84047)
58 East 7200 South. 801-566-4626
VIRGINIA — Alexandria, 22303
6201 Richmond Hwy. 703-765-5515
Norfolk (Virginia Beach, 23455)
1055 Independence Blvd. 804-460-0997
WASHINGTON — Seattle, 98109
505 8th Ave., N. 206-682-2172
WISCONSIN — Milwaukee, 53216
5215 W. Fond du Lac 414-873-8250

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Our finest scope—the IO-4235 Deluxe DC-35 mHz Oscilloscope

This deluxe delayed-sweep dual-trace oscilloscope is one of the most versatile oscilloscopes anywhere!

Ideal for measuring and observing virtually any type of waveform, from simple sine wave signals of high-fidelity components and television to highly complex waveforms of state-of-the-art devices
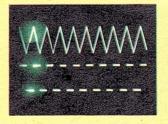
The Heathkit IO-4235 is the most advanced oscilloscope we've ever developed! Nearly 10 man-years of development have produced a scope which is unmatched in performance, features and quality in its price range. You can compare the sophistication and versatility of the IO-4235 with other scopes that cost hundreds of dollars more.
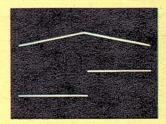
This laboratory-quality oscilloscope fulfills the requirements of the service technician, electronics designer and serious hobbyist. It's the perfect addition to your service desk, at a price you can afford.

The IO-4135's delayed-sweep circuit uses a separate time base to generate a faster sweep, which displays a selected portion of the normal waveform. The start and length of the delayed sweep are user-controlled, so any given portion of the normal waveform can be displayed at a much higher rate.

The 8 x 10 cm mesh CRT features 10 kV post acceleration voltage — 2½ times greater than any other scope we've offered — to give you greater writing speeds and a truly bright display. And the CRT has an internal graticule for parallax-free measurements.

The IO-4235 also has fully-regulated power supplies, a front panel 1-volt square wave output, a variable hold off control and much, much more. Calibration requires a precise source of square waves like the Heathkit IG-4505 (see page 69), and a DC voltmeter.

Kit IO-4235, Shpg. wt. 52 lbs. 869.95
Factory assembled and tested version of above.
SO-4235, Shpg. wt. 38 lbs. 1195.00

The delayed sweep takes the user selected portion of the waveform (intensified portion in the left picture) and magnifies it the desired number of times for closer examination (right picture).

Build a test bench with Heathkit scopes and accessories

Save $60 on our Dual-trace, DC-15 MHz laboratory-quality Oscilloscope kit

WAS $649⁹⁵

NOW $589⁹⁵ Kit

- **Excellent vertical sensitivity**
- **Internal delay lines for complete waveform display**
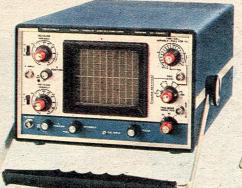
The IO-4510 gives unmatched quality and versatility at a low price. Vertical input sensitivity of 1 mV/cm over the entire bandwidth lets you read a x10 probe or waveforms to 10 mV.

The IO-4510 typically triggers on signals greater than 45 MHz and is guaranteed to 30 MHz, with only 1 cm deflection. And with digitally controlled triggering circuits, no stability control is needed.

Use either normal or automatic sweeps, with 20 time bases to choose from. Internal delay lines insure the start of a horizontal sweep before the beginning of the vertical signal, insuring complete waveform display. And fully regulated power supplies ensure stable voltages. Calibration requires precise source of square waves (see IOA-4510-1 or IG-4505, below).

Kit IO-4510, 36 lbs. .Was $649.95, Now only 589.95
Factory assembled and calibrated IO-4510.
SO-4510, Shpg. wt. 28 lbs. 840.00

IO/SO-4510 SPECIFICATIONS: VERTICAL: Sensitivity: 1 mV/cm to 5 V/cm in 12 steps. Variable: Continuous to approx. 15 V/cm. Rise Time: 24 nS. Overshoot: Less than 3%. Impedance: 1 megohm shunted by approx. 40 pF. HORIZONTAL: Time Base: Ramp: 0.2 sec/ cm to 0.1 μsec/ cm in 20 steps. Variable: Continuous between ranges to approx. 0.6 sec/cm. External Sensitivity: Approx. 0.2 V/ cm. External Impedance: Approx. 200 kilohms. Power Requirement: 120/240 VAC, 75 watts. Dimensions: 6.4″ H x 12.9″ W x 19.3″ D (handle extended).

Dual-trace DC-10 MHz Oscilloscope — ideal for service or design work

$399⁹⁵ Kit

- **Two vertical input channels**
- **Bright, easy-to-read trace**
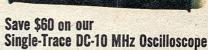
An excellent choice for electronic testing. The Heathkit IO-4550's extra-bright trace can easily be read — even in high ambient light conditions. And the two vertical input channels have a good 10 mV/cm sensitivity for more sensitive measurements. Display, chop or alternate input channels with a time base switch. The time base can be precisely triggered at any point on the positive or negative slope of the signal with a trigger select switch and level control.

The IO-4550 operates to specifications on line voltages from 100 to 270 VAC, thanks to a fully-regulated power supply. Mu-metal shielding helps prevent interference. Calibration requires precise source of square waves, such as the Heathkit IOA-4510-1 or IG-4505 (see below).

Kit IO-4550, Shpg. wt. 27 lbs. 399.95
Factory assembled and calibrated IO-4550.
SO-4550, Shpg. wt. 25 lbs. 595.00

IO/SO-4550 SPECIFICATIONS: VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm. Accuracy: Within 3%. Rise Time: 35 nS. Overshoot: Less than 5%. Maximum Input: 400 V. HORIZONTAL: Time Base: Ramp: 0.2 S/cm to 200 nS/cm. Sensitivity: Approx. 0.1 V/cm. Frequency Response: DC to 1 MHz. Power Requirement: 120/240 VAC, switch-selected, 70 watts. Dimensions: 6.9″ H x 12.9″ W x 19.3″ D (without handle).

Save $60 on our Single-Trace DC-10 MHz Oscilloscope

WAS $349⁹⁵

NOW $289⁹⁵

- **Digitally controlled trigger circuits**
- **Two input channels**

The Heathkit IO-4555 represents an unparalleled price/performance value — especially at its new low price. The IO-4555 is one of the few single-trace scopes available with two input channels. The Y-input and calibrated X-input can be used together for true X-Y capability. High or low-frequency waveforms can be observed easily, since the IO-4555's horizontal time bases can be easily switched from 0.2 S/cm to 0.2 μS/cm.

The digitally controlled trigger circuits require only a level control and a slope switch. The IO-4555 can trigger automatically or normally, over the complete 8 cm span. The extra-bright trace can even be seen in high ambient light conditions.

Kit construction is straightforward, with circuit boards and wiring harnesses to simplify assembly. And our performance-oriented engineering means you'll enjoy years of trouble-free operation.

Kit IO-4555, 29 lbs. . .Was $349.95, Now only 289.95

IO-4555 SPECIFICATIONS: VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm. Accuracy: Within 3%. Rise Time: 35 nS. Overshoot: Less than 5%. Maximum Input: 400 V. HORIZONTAL: Time Base: Ramp: 0.2 S/cm to 0.2 μS/cm. Variable: Continuous between ranges to approximately 0.6 S/cm. Impedance: 1 megohm shunted by 40 pF. Operating Temperature Range: 50°F to 104°F (10°C to 40°C).

Quality accessories to make your Heathkit oscilloscope even more versatile
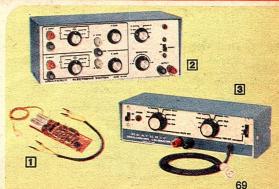
1 Scope Switch for dual-trace capability. Gives any single-trace scope with external trigger dual-trace versatility. Simultaneous display of two separate input signals for comparison, observing phase relationships or other uses. Also use as impedance coupler, preamp or square wave generator in experimental circuits. Sync output on each channel locks sweep to either signal. DC coupling adds versatility. The inexpensive way to get dual-trace.

Kit ID-4101, Shpg. wt. 5 lbs. 49.95

2 Deluxe Calibrator for oscilloscopes to 35 MHz bandwidth. A practical oscilloscope calibrator at a sensible price. Provides all the waveforms necessary to adjust sweep speeds, vertical calibration, delay line terminations, high-frequency compensation and attenuator compensation for oscilloscopes with bandwidth up to 35 MHz. Round out your test bench today with an accurate source of square waves — order the Heathkit IG-4505 Deluxe Calibrator.

Kit IG-4505, Shpg. wt. 4 lbs. 47.95

3 Low-priced Scope Calibrator for IO-4510, IO-4530. Easy-to-build, easy-to-use crystal-controlled time base for oscilloscope calibration. Provides everything you need to accurately calibrate your IO-4510 or other scope to 15 MHz. Draws operating power from IO-4510 or external 6V source.

Kit IOA-4510-1, Shpg. wt. 1 lb. 14.95

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quality and better value...because you build them yourself

$279⁹⁵ Kit — Heathkit DC to 5 MHz Oscilloscope offers dual-trace versatility at a single-trace price!

The Heathkit IO-4205 brings you controls and features not usually found in other scopes in this price range, plus dual-trace versatility! The dual-trace feature is essential for the sophisticated servicing required by many of today's modern electronic devices. It lets you compare two signals simultaneously for input-output comparisons, checking phase relationships and other timing functions. This dual-trace feature combined with the IO-4205's DC to 5 MHz bandwidth and excellent vertical input sensitivity of 10 mV/cm let you use it for nearly all waveform applications.

A stable triggering circuit is used for solid waveform displays — not the recurrent type sweep usually found on other scopes in this price range. A special TV position on the trigger selector control allows low frequencies to pass while high frequencies are rejected, so the IO-4205 will easily trigger on the vertical component of a complex TV signal. Any one of seven calibrated time bases, from 200 mS/cm to 0.2 μS/cm, can be selected with the time/cm switch.

Vertical input sensitivity is 10 mV/cm, and 11 calibrated attenuator positions, up to 20 V/cm, will accommodate a wide range of input signals.

Accurate measurements can be easily made on the bright, easy-to-read 8 x 10 cm CRT screen. The fully-regulated low-voltage power supply provides accurate voltage and current even under varying line and load conditions. Power consumption is only 50 watts! Partial mu-metal shielding helps eliminate display errors caused by stray magnetic fields.

The dual-trace capability of the IO-4205 makes it ideal for any comparison or timing functions on solid-state digital equipment. Its easy-to-operate controls and front panel inputs make it one of the most versatile oscilloscopes you'll find anywhere. And when you build it yourself, you get the economy of kit value, too! Dimensions: 8" H x 13" W x 17" D.

Kit IO-4205, Shpg. wt. 29 lbs.	279.95
Assembled and Tested. SO-4205, Shpg. wt. 20 lbs.	450.00

IO-4205 SPECIFICATIONS: VERTICAL: Bandwidth: DC to 5 MHz, −3 dB. Sensitivity: 10 mV/cm. Attenuator: 1-2-5 sequence, calibrated and variable. Rise Time: 70 nS. Overshoot: <5% at 1 kHz. Impedance: 1 megohm/38 pF. SWEEP: Type: Triggered. Range: 200 mS to 0.2 μS in 7 steps, plus variable. Trigger Source: Y_1/Y_2 External/Line. Trigger Modes: AC/DC/TV/+/− Slope/Auto/Normal. HORIZONTAL: Sensitivity: 0.1 V/cm. Bandwidth: DC to 1 MHz. Impedance: 1 megohm/50 pF. External Horizontal Input: X1 and X10 attenuator and variable. GENERAL: CRT: 5DEP31F, 8 x 10 cm viewing area, blue-green medium persistance phosphor, 5" round flat-face tube. Accelerating Potential: approximately 1.6 kV. Graticule: screened, 8 x 10 centimeters. Power Requirement: 120/240 VAC, 50/60 Hz, 50 watts. Dimensions: 8" H x 13" W x 17" D.

$199⁹⁵ Kit — Heathkit professional DC-5 MHz Oscilloscope that's priced right for the hobbyist, too!

- 10 mV/cm vertical input sensitivity — ideal for most applications
- Built-in calibration circuitry
- Your choice of internal or external time bases for more versatility
- High-brightness CRT for easy reading, even on complex signals
- Fully-regulated low-voltage power supply for stability
- Partial mu-shielding to reduce display errors

The IO-4105 DC-5 MHz Single-Trace Oscilloscope puts professional capabilities on your bench at a price you can afford! A stable triggering circuit is used for solid waveform displays. And the IO-4105 can trigger on the vertical component of a television signal — thanks to a special feature of the trigger selector control that allows low frequencies to pass while high frequencies are rejected.

Either internal or external time bases can be used with the IO-4105. Internal time bases can either be variable or in one of seven steps from 0.2 μS/cm to 200 mS/cm. External inputs from DC to 1 MHz are accepted by the horizontal amplifier. Excellent sensitivity — 10 mV/cm — combined with attenuation up to 20 V/cm in 11 calibrated steps — mean the IO-4105 accepts a wide range of input signals. And accurate control between settings is accomplished by a variable gain control. A bright, easy-to-read CRT screen provides clear displays.

The IO-4105 draws only 50 watts, and can operate on 120/240 VAC. A fully-regulated low-voltage power supply ensures accurate voltage and current — even under varying conditions. And partial mu-metal shielding helps eliminate display errors caused by stray magnetic fields.

The versatility and professional design of this scope make it ideal for virtually any single-trace scope application.

Kit IO-4105, Shpg. wt. 31 lbs.	199.95
Assembled and Tested SO-4105, Shpg. wt. 19 lbs.	375.00

IO-4105 SPECIFICATIONS: VERTICAL: Bandwidth: DC to 5 MHz, −3 dB. Sensitivity: 10 mV/cm. Attenuator: 1-2-5 sequence, calibrated and variable. Rise Time: 70 nS. Overshoot: <5% at 1 kHz. Impedance: 1 megohm/38 pF. SWEEP: Type: Triggered. Range: 200 mS to 0.2 μS in 7 steps, plus variable. Trigger Source: Y_1/Y_2 External/Line. Trigger Modes: AC/DC/TV/+/− Slope/Auto/Normal. HORIZONTAL: Sensitivity: 0.1 V/cm. Bandwidth: DC to 1 MHz. Impedance: 1 megohm/50 pF. External Horizontal Input: X1 and X10 attenuator and variable. GENERAL: CRT: 5DEP31F, 8 x 10 cm viewing area, blue-green medium persistance phosphor, 5" round flat-face tube. Accelerating Potential: approximately 1.6 kV. Graticule: screened, 8 x 10 centimeters. Power Requirement: 120/240 VAC, 50/60 Hz, 50 watts. Dimensions: 8" H x 13" W x 17" D.

Useful, reliable electronic gifts make flying safer

Our versatile Air Navigation Computer helps get you there safely!

$169.95 Kit

- THREE built-in microprocessors
- Multi-function display
- Built-in clock and timer
- Scientific calculator functions
- Up to NINE flight leg entries
- ETA to checkpoint and destination
- Flight leg countdown
- Automatically computes in-flight wind

Heath builds versatility, precision and quality into its OC-1401 Hand-Held Air Navigation Computer!

The OC-1401 accepts preflight data and vectors for up to nine separate flight legs. It computes magnetic heading, ground speed, true air speed, time to next checkpoint or destination and estimated time of arrival — all with single keystroke callups. And it automatically computes in-flight wind, updating information in flight (including ETAs). You'd need an on-board computer to have more power.

Only an on-board computer could give you more power than the OC-1401. Our Navigation Computer has a multi-function 14-digit display, 36-key keyboard, built-in elapsed timer and clock, fuel warning indicator and Quasi RNAV function for heading to intermediate or non-VOR destination. It computes reciprocal headings for traffic pattern entry and 180° turns. Converts statute miles to nautical miles,

miles to kilometers, hours/minutes/seconds to decimal hours, °F to °C, gallons to liters — and their reciprocals. The OC-1401 can also operate as a versatile scientific calculator, with nine addressable storage locations and an additional five-level stack.

Built-in diagnostic checks help assure proper operation. Four built-in rechargeable batteries (included) allow at-home programming and memory preservation to airport. Can also be powered by aircraft lighter socket with 14 VDC cord (included) or by optional carrying case/rechargeable battery power supply (below). Operating manual included. Complies with FAA Advisory Circular No. 60-11, describing guidelines for using navigation computers during airmen written tests.

Kit OC-1401, Shpg. wt. 3 lbs. 169.95
OCW-1401, Assembled and Tested, 4 lbs. . . . 274.95

The Heathkit OC-1401 — the navigation computer that does more!

Many of the features of this computer make it one of the most sophisticated, useful instruments of its type. This sophistication is made possible by three custom-designed, microprocessor integrated circuits. Computer entries are made on a 36-key keyboard, while entries and answers are clearly displayed on a 14-digit, seven-segment display. And the OC-1401 is designed for years of trouble-free operation.

OC-1401 SPECIFICATIONS: Basic Architecture: RPN-5 level stack, Auxiliary Storage-9 addressable registers, last X register. **Display Modes:** Variable round-off, fixed point, or scientific notation, 9-digit mantissa and 2-digit exponent. **Flight Functions:** True airspeed, wind triangle, up to 9 flight leg calculations, navigation by two VORs and ETA. **Dynamic Displays:** Clock, elapsed time, fuel remaining, distance and time to checkpoints. **Dimensions:** 1¾" H x 3⅛" W x 6⅜" D (4.5 cm H x 7.9 cm W x 16.2 cm D).
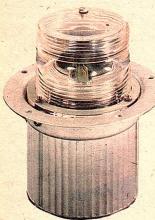
Deluxe Carrying Case for your OC-1401 Navigation Computer

Convenient custom carrying case is designed to hold your aircraft navigation computer and its accessories. It features a separate independent rechargeable battery power supply that operates from a standard AC outlet from no charge to full charge in approximately 15 hours. Handy pocket for carrying your operation guide and fitted compartments for chargers and sunshield. Dimensions, 3⅛" H x 12¼" W x 8" D.

Kit OCA-1401-1, Shpg. wt. 5 lbs. 39.95
OCW-1401-1, Factory Assembled and Tested.
Shipping weight 5 lbs. 74.95
OCA-1401-2, Leatherette Carrying Case for OC-1401 only. Shipping weight 1 lb. 4.95

Strobe Light/Beacon for Aircraft/Emergency Vehicles

The Heathkit OL-1155 Aircraft Strobe Light signals a truly unusual kit-form value! It's designed as an aircraft strobe light for use as an anti-collision or supplemental beacon — or directly replaces a standard 3¾" rotating beacon. It operates from a 12 VDC negative ground supply, drawing a nominal current of 1.5 amperes, and includes a built-in line filter. An internal adjustable trimmer lets you vary the flashing frequency from 40 to 60 flashes per minute. The OL-1155 can be used in any number of emergency applications. Mount it on your boat cabin-top or masthead for marine foul-weather anti-collision protection. Use it atop antennas or other tall structures as a highly visible marker light. Or use it on emergency vehicles with optional red or amber lenses (below). Meets FAA Regulation No. 23.1401 anti-collision lighting requirements.

Kit OL-1155, with Clear lens, Shpg. wt. 3 lbs. 89.95
OLA-1155-2, Red lens, Shpg. wt. 1 lb. 8.95
OLA-1155-3, Amber lens, Shpg. wt. 1 lb. 8.95
NOTE: For the FAA PMA certification necessary for aircraft installation, return your completed OL-1155 to your local Heathkit Electronic Center or the Heath factory.

High-accuracy, rugged, low-priced Aircraft Clock/Timer

Gives you the accuracy and reliability you need for any flight timing function at about half the cost of competitive models! Quartz-crystal-controlled timing functions provide exceptional accuracy. Upper display shows 24-hour GMT/ZULU time, lower display shows local time, acts as 24-minute timer, 24-hr. trip timer and has alarm function for fuel management and check-point notification. Both clocks run continuously, but trip timer runs only when plane's master power switch is on. Displays dim automatically for night flying. Fits standard 3⅛" panel mount, can be easily mounted in almost any aircraft. Operates on either 14 or 28 VDC, draws only 0.5 A maximum, with less than ±1 minute typ. accuracy per month.

Kit OI-1154, Shpg. wt. 3 lbs. 129.95
Note: FAA approved for Cessna 172N, STC No. STC SA168GL (requires FAA Form 337). Field approval on FAA Form 337 required for other aircraft. Completed kit must be returned to a Heathkit Electronic Center or factory for DMIR inspection (at no additional charge), before installation by an A & P mechanic (or supervised pilot installation). Heath will adjust for maximum accuracy. Meets DO-160 environmental requirements.

Heathkit Computer Systems—with extra-value convenience

The world's leader in quality electronic kits leads the way in personal computers and computer systems that give you more values and features — while saving you money

For over 30 years, Heath Company has been at the forefront of consumer electronics, most recently in computers. Heath was one of the first to offer a personal computing system when we designed an analog computer back in 1957. We felt, even back then, that computers were the wave of the future, so we kept up our interest and enthusiasm for computers. Today, Heath continues to develop one of the most complete and innovative lines of computers and computer systems available anywhere. Whether you purchase Heathkit Computer products in economical, easy-to-build kit form or as fully assembled units, you'll get well thought-out, expertly designed products that offer substantial benefits over competing products. When you buy Heathkit Computer products, you get extra value for your computing dollar.

- Three different computer systems to fill any computing need
- A full selection of video terminals and other peripherals
- Dual floppy disk storage systems
- Versatile systems software
- Guaranteed updates of disk-based software for one year after purchase
- Memory and interfacing to make your Heathkit Computer even more versatile
- Thorough and accurate Heath documentation — the best in the computer industry
- Complete nationwide service support

SAVE 5% when you buy a system!

H8 8-Bit Personal Computer

H89 All-In-One Computer with Floppy Disk Storage

H27 Floppy Disk System for the H11A Computer offers dual-drive versatility

How to select a computer. There are many considerations in selecting a computer: Do you want built-in peripherals or the flexibility to design your own system? Do you want the ability to expand your memory power as your skills grow? How good is the systems software? Is it compatible with existing software? Will the manufacturer stand behind the computer? You can be sure of the answers to these questions when you consider the full line of Heathkit Computers and computer systems.

Three very different computers for very different people. Heath designs computers for people, and because people want very different things from computers, Heath has designed three different computers:

For flexibility — the H8. If you're interested in developing hardware, need more than 48K of read-write memory or write physical I/O routines in Assembly language, the H8 is for you. Its versatile bus-oriented architecture, expandability and hardware front panel position it as the right computer choice. With seven plug-in positions for memory and I/O, you have the flexibility to design your own system. See page 76 for more H8 details.

For convenience — the All-In-One H89. If you're more interested in running software than in hardware development and experimentation, the H89 gives you a complete, balanced computer system in one convenient package. It's less flexible and expandable than the H8, but the H89 is every bit as powerful and very cost-effective. And the H89 has a "personality" which a first-time computer user will find comfortable. The H89 includes your computer, terminal, floppy, 16K RAM, keyboard and keypad. Just add software and you're ready to run. For more information on the All-In-One Computer, see page 74.

For advanced applications — the 16-bit H11A. If you need a computer for scientific uses, real time systems or other advanced applications, and DEC PDP-11V03 hardware and software capability is significant, the H11A is your choice. We offer a large selection of compatible hardware and software, including an IBM 3740 compatible 8-inch disk system, BASIC and FORTRAN languages and optional hardware floating point arithmetic. See page 78 for more information on the Heathkit H11A Computer.

Value-packed Heathkit Software includes programs written in MICRO-SOFT™ BASIC™ and Assembly languages, in audio cassette or floppy disk formats, that make our computers more versatile for you. Our complete software line can help you write your own programs easily. And we won't let your disk-based Heathkit Software go out of date — for one year after purchase, we'll send you any changes, free of charge. See page 82 for full details on easy-to-use Heathkit software.

HUG — the Heath Users' Group — keeps you informed of new computer programs written by other members and available to you, and keeps you up to date on new developments in Heathkit Computer Products. Owners of Heathkit Computers can become members of this group, which shares an extensive program library. See page 84 for more details on HUG.

Heath documentation is the best in the computer industry. If you want to build a Heathkit Computer System yourself, we make it easy with complete, easy-to-follow assembly manuals which take you, step-by-step, from unpacking to plugging it in. You'll understand your computer from the inside out. And in both kit and assembled forms, Heath's operating and instructional manuals are fully detailed and thorough. Documentation is one of the most important parts of any computer system, and when it comes to documentation, you'll begin to realize the full value of a Heathkit Computer.

and flexibility for your needs

H19 Smart
Video Terminal

H14 Hard Copy
Line Printer

Powerful H11A 16-Bit
Personal Computer

Heath offers complete service support. Technical expertise, advice and service for your Heathkit Computer System are always available. Service experts at the Heath factory or at the 55 Heathkit Electronic Centers from coast-to-coast can help you keep your Heathkit Computer System working right. That's one important advantage of buying your computer from a company with 30 years of experience in computing.

You get the convenience of one-stop shopping for all of your computer needs. The complete selection of Heathkit Computers, terminals, printers, computer accessories and software is available between the covers of the Heathkit Catalog. Heathkit Computer Products are designed to work together, and to look like they belong together. When you buy a Heathkit Computer System, you can count on a balanced, harmonious system. And you'll take pride in knowing that you built it yourself.

The time to purchase a computer has never been better.

Save 5% when you purchase a complete Heathkit Computer System. Simply choose the H8, H11A, H88 or H89 computer, one major peripheral and any I/O devices and accessories you need to complete your computer system. Then, deduct 5% from the total price (excluding shipping and handling charges). It's the ideal way to get the exact computer system you need.

Is your business ready for a computer? Here's an easy way to find out the answer

NEW

$49⁹⁵

Computer Concepts for Small Business is designed to give you the information and understanding you need to evaluate the usefulness of a computer in your business. Are the benefits worth the cost? Our program helps you decide.

If you're a businessman who's thinking about using a computer in your business, Computer Concepts for Small Business is for you. Designed for the businessman who knows little or nothing about computers, this program shows you how a computer can serve your business needs. It covers:

The Computer and How It Works: Including types of memory, storage media, I/Os and software. A detailed discussion of different types of applications software, covering the typical tasks a computer system can perform for a small business.

The Data Processing Department and Personnel: This covers the organization of a typical data processing (DP) department; the roles of the data processing manager, data processing engineer, systems analyst, operator and other personnel; and a comparison of permanent employees versus free-lance personnel, including the advantage of each type of employee.

Alternatives in Computer Services: Including a comparison of the advantages of owning your own computer system versus a time-sharing arrangement and using a service bureau, with a discussion of the typical problems of each arrangement.

How To Select a Computer: Discusses how to define your data processing requirements; how to put together the right combination of hardware, peripherals and software; and how to get the most from outside data processing services.

The program includes a 160-page text with 3 appendices and 3 cassettes. Completion of the final exam with a passing grade earns you 1 CEU.

EC-1103, Shpg. wt. 5 lbs. 49.95

All-In-One Computer: a complete system in one compact unit

You can get all the power and built-in peripherals you need for any personal computing task in one compact, desk-top computer—the Heathkit All-In-One Computer! With convenience features that make it easy to program and operate, this 8-bit computer can make computerizing your home or business a reality.

The All-In-One's heavy-duty professional keyboard can control all video terminal functions, with eight user-function keys available to give you extra flexibility. Select baud rates of up to 9,600 through the keyboard. Direct cursor addressing lets you insert and delete characters anywhere on the screen, and the terminal supports line graphics characters from keyboard or computer.

Designed in calculator format, a numeric keypad makes entering arithmetic programs faster and easier. Shifted functions give you cursor control for insertions and deletions.

The smart video terminal is one of the most sophisticated ever designed. Both the terminal and the computer have their own Z80 microprocessors. This means the All-In-One Computer can perform a multitude of high-speed functions, because the terminal never has to share processing power with the computer — not the case with most other desk-top computers and computer systems.

A 12-inch (diagonal measure) cathode ray tube produces clear, sharp, easy-to-read characters. Upper and lower case letters are formed by a 5 x 7 dot matrix in the format of 24 lines by 80 characters (with a special non-scrolling 25th line). Lower case letters with descenders use a 5 x 9 dot matrix. Also features 33 line graphics characters using 8 x 10 dot matrix.

You can expand the Heathkit All-In-One Computer to meet your needs. It comes with 16K RAM, expandable to 48K, with memory diagnostics built in to make memory checks faster and easier. Accessory interfaces let you communicate with printers, cassettes or time-share systems (with appropriate software), and all communication is EIA RS-232 Standard.

The built-in floppy disk system makes this a true All-In-One Computer, giving you tremendous storage capacity for programs and data. Each 5¼-inch diskette has 100K bytes of storage. The WANGCO/Siemens single-drive floppy disk system gives you virtually instant access to any information. Load programs in seconds, access and update data fast with the same H17-1 drive described on page 77.

The All-In-One Computer is built to withstand the toughest working environments, with a tough, rugged structural foam cabinet protecting its circuitry. And a convenient lift-off top gives you easy access to the H89 Computer's components and circuitry.

Order your Heathkit All-In-One Computer today. With so much computing power and so many features built in, this desktop computer brings exceptional value within your reach. Put this exceptional value to work for you now!
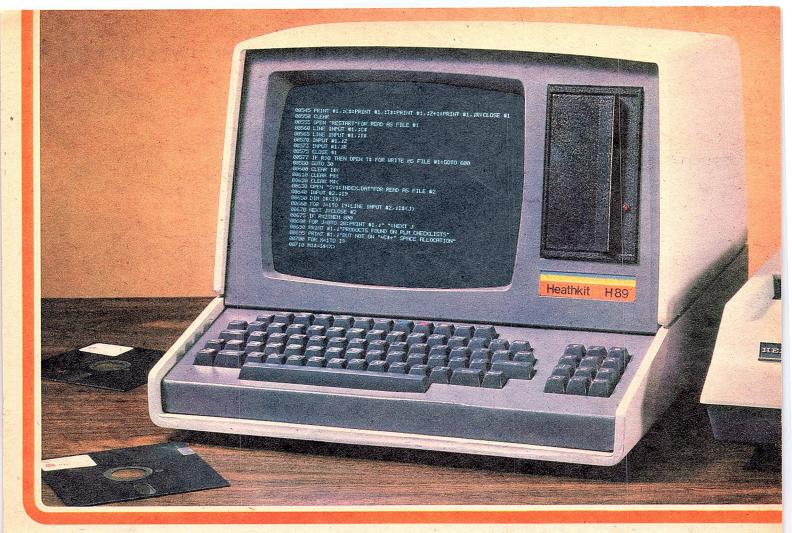
H89 All-In-One Computer, with floppy disk system. Includes H88-5 Audio Cassette Interface.
Kit H89, Shpg. wt. 86 lbs. 1695.00
WH89-CS Completely Assembled All-In-One Computer, with floppy disk system, 48K memory and serial I/O. Does not include H88-5 Audio Cassette Interface.
WH89-CS, Shpg. wt. 54 lbs. 2895.00
H88 All-In-One Computer, without floppy disk system. Includes H88-5 Audio Cassette Interface.
Kit H88, Shpg. wt. 59 lbs. 1295.00

H88 All-In-One Computer without floppy disk system.

Two independent Z80 microprocessors enable terminal and computer to act independently. CPU is completely wired and tested.

To add memory simply plug ICs into sockets. No soldering necessary.

High-resolution CRT with P4 phosphor produces sharp, clear images.

Video screen displays 1,920 easy-on-the-eyes characters at one time.

Rugged structural foam cabinet protects your All-In-One Computer.

Two-port serial I/O interface hooks up to time-share systems and printers. H88 and H89 include cassette interface.

H89 includes built-in floppy disk storage.

Numeric keypad in calculator format permits faster, easier arithmetic entries.

Professional electronic keyboard designed for easier reach, surer touch.

SPECIFICATIONS: Processor: Z-80. **Clock:** 2.048 mHz. **Memory:** 16K bytes user RAM (expandable to 48K). **Video Terminal:** High-resolution CRT with P4 phosphor. **Screen Character Capacity:** 1,920 characters. **Character Type:** 5 x 7 dot matrix (upper case), 5 x 9 dot matrix (lower case with descenders). **Keyboard:** 80 keys, typewriter format, with numeric keypad in calculator format. **Cursor:** Blinking, non-destructive underline or block. **Cursor Controls:** Up, down, left, right, home, CR, LF, back space and tab. **Cursor Addressing:** Relative and direct. **Tab:** Standard eight-column tab. **Refresh Rate:** 60 Hz at 60 Hz line frequency, 50 Hz at 50 Hz line frequency. **Edit Functions:** Insert and delete character or line. **Erase Functions:** Erase from beginning of line, erase to end of line, erase from beginning of page, erase to end of page, erase line and erase page. **Power Requirement:** 120/240 VAC, 50/100 Hz at 90 watts maximum. **Dimensions:** 13" H x 17" W x 20" D (33 cm x 43.2 cm x 50.8 cm).

Accessories and software let your All-In-One do even more!

The Heathkit All-In-One Computer runs programs written in MICROSOFT™ BASIC and Assembly languages, including scores of practical programs for your home or business. And the optional accessories enable you to perform more tasks, store more data and communicate with more peripherals, making the All-In-One even more versatile!

Cassette Systems Software for the Heathkit All-In-One Computer. Easy-to-use features include extended Benton Harbor BASIC, a modified version of Dartmouth BASIC, an easy-to-learn-and-use conversational language which uses simple English statements and algebraic equations; Assembly (HASL-8), a language which assembles source code and produces object code, utilizing all the standard 8080 mnemonics, extended mnemonics and numerous pseudo instructions; Text Editor (TED-8), a general-purpose, line-oriented text editor that is used primarily to prepare source code that can be assembled using the HASL-8 Assembly Language above, but can also be useful for letter writing, manuscript editing and preparation of newsletters; and Console Debugger (BUG-8), which you can use to load, execute and debug machine language programs in your computer.
H88-18, Shpg. wt. 5 lbs. **20.00**

Systems Software for the All-In-One Computer's Floppy Disk Storage System. Includes a diskette containing extended Benton Harbor BASIC; a two-pass absolute assembler; a text editor to prepare source code for BASIC and other languages; a full set of disk utility programs for convenient file manipulation and a console debugger to make debugging user machine language programs easier and faster. Dynamic File Allocation permits efficient use of free disk space, eliminating time-consuming disk-compacting utilities. Supplied on a standard diskette.

H89-17, Shpg. wt. 5 lbs. **100.00**

16K Random Access Memory Expansion Chip Set. Expand the capability of your Heathkit All-In-One Computer by adding one or two 16K RAM chip sets. The All-In-One Computer is equipped with 16K RAM; maximum memory capacity is 48K RAM.
H88-2, Shpg. wt. 1 lb. **150.00**

Two-Port Serial I/O Interface. Lets the All-In-One Computer communicate with the H14 Line Printer, time-share systems (with appropriate software) or any other serial peripheral. Two serial I/O ports support an EIA standard RS-232-C interface.
H88-3, Shpg. wt. 2 lbs. **85.00**

Popular MICROSOFT™ BASIC Computer Language. One of the most versatile languages for personal computing. Features direct access to CPU ports and memory locations, IF-THEN-ELSE control structure for more highly-structured programming, powerful program edit and file management facilities, powerful string processing functions, automatic line numbering and renumbering, double-precision floating point arithmetic, more. Requires floppy disk drive and minimum 32K memory (48K recommended).
H8-21, Shpg. wt. 3 lbs. **100.00**

Floppy Disk Storage System, Drive and Interface for the H88 All-In-One Computer. Store up to 100K bytes of information on each 5¼-inch diskette. Famous WANGCO/Siemens single-drive system for speedy access to information. (Included in H89 only). Diskettes not included.
H88-4, Shpg. wt. 22 lbs. **450.00**

Audio Cassette Interface for WH89 All-In-One Computer. Connects your WH89 with a cassette recorder/player, such as the Heath-recommended ECP-3801A (page 80). Allows your computer to store and use more information. Standard with H88 and H89 All-In-One Computers.
H88-5, Shpg. wt. 2 lbs. **95.00**

8080A-based computer with front keyboard, digital readout and 7 plug-in board positions

- Built-in ROM monitor controls front panel program
- Heavy-duty power supply handles to 65K memory
- Get both hardware and software support from the same reputable source

The Heathkit H8 — the computer that grows as you grow. You get the flexibility to design your computer system just the way you want it. With seven positions for plug-in modules, you can put together any combination of memory and I/Os.

Our large selection of H8 peripherals, accessories and software give you unmatchable versatility.

Novices can use the H8 as a computer trainer by adding 4K of memory. The 16-key front panel keyboard provides octal data entry, direct access to registers and memory, one-button program load and dump, and input/output keys to directly communicate with any port. And you can directly monitor program activity with the H8's nine-digit octal readout, which provides much more information than conventional computers.

The features we pack into the H8 Computer mean more value to you. A heavy-duty power supply lets the H8 handle up to 65K of memory (including I/O), while convection cooling means no fan is needed to prevent overheating.

The CPU board, including the 8080A chip, clock, systems controller and ROM monitor, is fully assembled, wired and tested for easier kit assembly and faster system setup. An exclusive Heath-designed 50-pin fully-buffered bus gives you more room for memory and I/Os. The H8's built-in speaker gives you audible feedback and special effects. Front panel status lights keep you up to date on your computer's status. With all these features and more, the Heathkit H8 Computer is an excellent choice to be the heart of your computer system.

When you add more memory, interfaces and peripherals, your H8 System can become even more powerful and versatile. You'll be able to write more highly sophisticated, higher-level programs. The optional H17 Floppy Disk System gives you even greater storage capacity, and the capability to load programs and update files instantly.

The unique flexibility of the H8 means you can design an H8 Computer System from a vast selection of peripherals and accessories — including additional memory, cassette data storage, CRT terminals, hard copy printers and an acoustic modem — to meet your unique computing needs. And because the H8 is based on the popular 8080A CPU, the amount of existing software makes your system immediately practical.

Design your own H8 Computer System

With seven plug-in board positions for memory and input/output devices, your Heathkit H8 Computer System can grow as your needs grow. Some of your options are described on the chart below. Each box represents a plug-in module.

Memory	16K WH8-16	8K H8-3 + H8-1	4K H8-1
Mass Storage	Cassette ECP-3801A	Floppy with controller H17	
Interface	Serial/Cassette 1-port H8-5	Serial 4-port H8-4	Parallel 3-port H8-2
Peripherals	Terminal H9, H19	H14 H36, WH34	MODEM WH-13

flexibility at an affordable price–and floppy disk capability

Heavy-duty power supply, rugged steel chassis and securely mounted and braced circuit boards

Modular circuit boards slide into the mainframe for easy memory and I/O expansion, easy servicing

The H8's intelligent front panel provides the most informative display of any personal computer

Front panel keyboard gives you more control of your H8 Computer

Use the H8 as the heart of your computer system

When you buy the Heathkit H8 Computer, you get the flexibility and versatility you need to really personalize your computer system — at a price that fits your budget. Whether you buy one of our complete systems or design your own, you can build an H8 System to suit your needs.
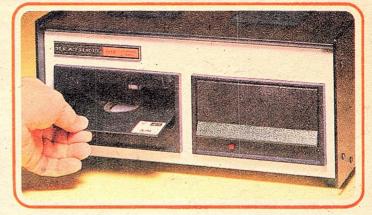
Memory and I/O accessories are offered separately from the computer itself, so you have complete freedom to assemble a computer system that meets your specific computing needs. To build a complete system using the H8 you'll need both memory and interface accessory cards. The type and number of memory and interface accessories you'll need will be determined by your application.

The H8's optional software is supplied in 1200 baud audio cassette or diskette forms to help get you up and running faster. You can begin communicating with the H8 right away, with Benton Harbor, BASIC, the HASL-8 2-pass absolute assembler, the TED-8 line-oriented text editor and the BUG-8 terminal console debugging program. For complete details on H8 software, see page 82. When you buy an H8 Computer, you'll also be eligible for membership in HUG, the Heath Users' Group, which maintains a growing program library. Details on page 84.

The value-priced H8 is housed in a heavy-duty metal cabinet with modern, high-impact structural foam side panels. Operates on switch-selected 120/240 VAC, 50/60 Hz. Dimensions, 6½" H x 16¼" W x 17" D. Requires at least 4K of memory to operate. (See page 83).

Kit H8, Shpg. wt. 31 lbs. **289.00**

Factory Assembled and Tested H8 Computer.

WH8, Shpg. wt. 30 lbs. **349.00**

Examine the manuals before you buy. Here's your chance to look before you buy, and with no risk. The HM800 Manual Set includes complete assembly and operations manuals for the H8 Computer, H8-4 Interface, H14 Printer, WH8-16 Memory Board, H19 CRT and H8-17 software. When you order the H8 Computer, deduct $25.00 from the purchase price (not including shipping and handling charges). HM800, Shpg. wt. 11 lbs. **25.00**

NOTE: Individual product manuals are included with each kit.

H17 Floppy Disk makes your H8 System ever more versatile

You get vast storage and programming capacity, instant access to any program and easy loading with the H17 Floppy Disk System. You'll really see the power of your computer once you add a floppy disk system. And with the optional second drive, you can profit from added dual-drive versatility and capacity.

The H17 Floppy Disk System gives you the storage and programming capacity you need to load programs instantly. Store hundreds of programs on a single disk and have immediate access to any one of them, anytime you need it. And you can update your data instantly. The H17 makes your H8 Computer System a "total versatility" system.

Designed exclusively for use with the H8, the H17 stores up to 100K bytes of data on a standard, hard-sectored 40-track diskette which measures just 5¼" in diameter. The disks are easier to handle — and easier to load — than paper tape or cassettes.

The H17 uses the famous WANGCO/SIEMENS 82 single drive system, a performance-proven disk drive which provides accurate high-speed access to data. The WANGCO/SIEMENS 82 performs much better than most equivalent competitive drive systems. And it's supplied fully assembled and tested for the H17.

To get even more data and program storage area, add the optional H17-1 Second Drive and make your H17 a versatile dual-drive floppy disk system.

To use the H17 effectively, you need at least 16K RAM for the H8 and the H8-17 Operating Systems Software (see p. 82). A single blank diskette is included.

Kit H17, Shpg. wt. 28 lbs. **495.00**

WH17, Factory assembled and tested H17. Shpg. wt. 28 lbs. **550.00**

Optional Second Drive. Adds dual-drive versatility to the H17. Get a total of 200K bytes of available data and program storage area.

H17-1, Shpg. wt. 5 lbs. **295.00**

Package of 5 Blank Diskettes for use with the H17 Floppy Disk System.
H17-2, Shpg. wt. 1 lb. ....**each 25.00**

H17 Floppy Disk Operating Software gets you running fast

Get your floppy disk system up and running fast with specially engineered systems software — loaded with convenience features

The Operating Systems Software for the H17 Floppy Disk System includes a diskette containing the standard H8 software. This includes Extended Benton Harbor BASIC, a 2-pass absolute assembler, a text editor to prepare source code for BASIC, Assembly and other languages, a console debugger for easy debugging of user machine language programs and a full set of disk utility programs to make file manipulation more convenient for you.

Special features of the operating software include Dynamic File Allocation, which automatically keeps free space available to permit unlimited file size and prevent squeezing of disks. Special facilities support running and backup of single-drive configurations to permit copying and transferring between disks, even with a single-drive system. Device independence permits direct communication between any program and any device. A file utility program allows bulk manipulation of files.

Get the most from your H8 Computer and H17 Floppy Disk System with H8-17 Operating Software. Supplied on a standard diskette.

H8-17, Shpg. wt. 14 lbs. **100.00**

The most popular business/science computer on the market is now available at a price you can afford

Designed for the more serious computerite, the Heathkit H11A Computer offers the power and potential you need to implement more sophisticated computing applications. Most computerites find that their problem-solving and programming capabilities grow quickly, and before long, they run out of computing power. The H11A is the computer that meets the demand for superior performance in scientific, educational and small business applications. When you buy the H11A Computer, you get real computing potential.

The H11A gives you all of the power, speed and flexibility you'll ever need in a microcomputer. It uses the same powerful microprocessor and runs all software designed for the DEC® PDP-11/03. You can choose from a vast selection of practical programs to run your home more efficiently, to reduce the clerical costs of your business and to process all types of data more efficiently than before. If you've been around computers and your computing needs require extra power, the H11A Computer is designed for you.

The 16-bit vs. 8-bit issue: Your choice of a 16-bit or 8-bit computer depends upon your needs. If you're an advanced hobbyist or professional with demanding computing applications, the 16-bit H11 is your best choice. The H11A has adequate computing power, even for the more complex and sophisticated jobs that you will be tackling later. When you buy the H11A, you are purchasing ultimate immediate performance and maximum future potential.

The H11A features the new, physically smaller KD11-HA microcomputer (half-size LSI-11/2). This makes the Heathkit H11A identical to the DEC PDP-11/03, but at a fraction of the cost. This smaller configuration allows you to put more computing power and versatility into the H11A by providing an extra plug-in slot for additional memory or I/O interface.

You get the flexibility to configure the exact computer system you require with the H11A. Seven plug-in slots let you add any combination of I/Os and a maximum of 60K bytes memory. The basic Heathkit H11A Computer is supplied with a handsome cabinet, heavy-duty power supply, and a backplane that includes bus and a fully assembled CPU board. You can add your selection of optional memory and I/O accessories to the mainframe. A wide selection of software is also available. (See pages 82 and 83 for accessories and software to make your H11A Computer System even more versatile. Complete H11A Systems Software for the H27 Floppy Disk System is available below).

Heart of the H11A — the KD11-HA Microcomputer

The KD11-HA 16-bit Microcomputer module forms the heart of the H11A Computer. It's only half the size of the KD-11F (LSI-11), but you get more flexibility when you configure your H11A System.

There is no on-board memory, so you can match your RAM/ROM requirements to meet your particular needs. And full compatibility with the LSI-11 family means you can combine components from both the LSI-11 and LSI-11/2 families.

Features of the KD11-HA include a PDP-11/34 instruction set, a raw computer speed of 380 nS microcycle time, resident firmware debugging (ODT) and ASCII console routines, as well as single and double operand instructions. The KD11-HA gives you the power and flexibility you need for advanced system configurations.

H11A Operating Systems Software for the
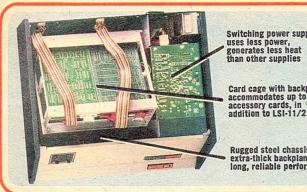
The HT-11 Systems Software lets you immediately enjoy the full benefits of a rapid-access floppy disk system. You get easy-to-use programs, including:

EDIT: A text editor to create or modify files for programs and documentation.

EXPAND, ASMBLE AND CREF: Utility programs for macro-expansion, Assembly Language processing and cross-reference listings. Supports the entire PDP-11 instruction set and several pseudo-operators.

LINKER: Converts object modules produced by the assembler or the FORTRAN compiler into a run time format. Services include relocation of code, linking of global references and the creation of a runable program file for use by the rest of the system.

LIBRARIAN: Creates and maintains libraries of subroutines for use by the linker.

PIP: The Peripheral Interchange Program is the file maintenance and transfer utility program of the HT-11. It has commands for moving, copying and renaming files, plus other commonly-used file operations.
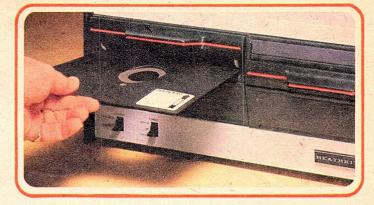
to the advanced computerite—at an affordable price

Switching power supply uses less power, generates less heat than other supplies

Card cage with backplane accommodates up to seven accessory cards, in addition to LSI-11/2

Rugged steel chassis, extra-thick backplane for long, reliable performance

Get the power and versatility you need in the H11A Computer

- 16-bit computing power with up to 60K words of memory
- DEC® half-size KD11-HA (LSI-11/2) CPU
- Compatible with DEC PDP-11/03
- Plug-in flexibility for memory and I/Os

Learn by building it yourself. What better way is there to know your computer than by building it yourself? The Heathkit H11A Computer lets you understand it better. You can build it yourself and benefit from the knowledge — and the savings. Like all Heathkit designs, the H11A comes with an easy-to-follow assembly manual — and a nationwide network of service centers to help you, should a problem arise. And when you build it yourself, you can also perform more of the service steps yourself, to keep your computer in top operating form.

Whether you buy an H11A Computer System or the computer itself, compare the price of the H11A with comparable 16-bit computers. Buy this extra-powerful Heathkit computer and find out why the combination of advanced design and quality components make the Heathkit H11A Computer one of the best 16-bit computer values anywhere.

Kit H11A, Shpg. wt. 43 lbs. 1095.00

Factory Assembled and Tested H11A Computer.
WH11A, Shpg. wt. 43 lbs. 1895.00

SPECIFICATIONS: **Central Processing Unit:** Uses DEC KD11-HA CPU. **Word Length:** 16 bits. **Instruction Set:** PDP-1103. **Memory:** Directly addresses 32 K. **I/O Addressed:** 28 K to 32 K. **RAM/ROM:** 0 to 28 K. **Backplane:** Eight 2-wide module slots. **Power Supply:** Overcurrent and overvoltage protected, switching regulator. Internal fan for cooling. **Inputs:** 120/240 VAC; 60/50 Hz, at 200 watts maximum. **Outputs:** +5 VDC at 15 amperes maximum and +12 VDC at 3 amperes maximum. **Cabinet Dimensions (overall):** 6½" H x 19" W x 17" D. (16.5 x 48.3 x 43.2 cm).

**DEC, DIGITAL and PDP are registered trademarks
of Digital Equipment Corporation.**

H27 Floppy Disk gives you instant access to data

- Z80 Microprocessor-based controller
- Full compatibility with DEC RX01® (PDP-11/03)
- Fast head step time of 8 mS
- Dual-drive capability for a total capacity of ½ Meg bytes

The H27 gives you dual-drive versatility, with a total of ½ Meg bytes of program and data storage to give you enough room for most of your general-purpose application needs. The Z80 Micro-controller in the H27 provides an average access time of 252 mS. You'll have virtually immediate access to all your files and programs.

You get full compatibility with DEC® RXV11® (PDP-11/03) hardware and software, to give you the capability of using the hundreds of applications programs written by users of the DEC PDP-11/03, the world's most popular microcomputer. Performance-proven hardware and software base provides outstanding computer power. While compatible with the RX01 system, the H27 gives you more. A built-in self-test diagnostic on power-up protects existing programs on your disks. A mechanical interlock prevents accidental media damage (if the floppy is not seated properly, the door will not close and the H27 will not operate). A write-protect function protects important files and programs from being written over inadvertently. And a reformatting procedure gives you the capability of writing in the IBM 3740 standard format.

A single-board interface/bootstrap uses one backplane slot, leaving more space for memory and I/O additions to your H11A Computer System. The H27 Floppy Disk System measures 8" H x 18" W x 20" D. It operates on 120 or 240 VAC, 60 Hz power. To use the full capabilities of the HT-11 Operating Systems Software, designed for use with the H27 Floppy Disk System, you need at least 16K words of memory.

Kit H27, Shpg. wt. 93 lbs., Motor Freight 1895.00
WH27 Dual-Drive Floppy Disk System. Fully assembled and tested.
WH27, Shpg. wt. 69 lbs., Motor Freight 2595.00
H27-2, Pkg. of 5 Blank Disks. IBM 3740 format. Shpg. wt. 2 lbs. 25.00

H27 Floppy Disk System to help you get your computer system operating quickly and efficiently

ODT: The HT-11's On-line Debugging Technique aids in debugging user programs by providing commands to display and alter the state of a running program.
BASIC INTERPRETER: This high-level conversational programming language offers access to the HT-11 I/O system and file structure through the BASIC Language. Extensions to standard BASIC include variable-length strings, sequential files, virtual memory arrays, chaining and overlay capability. A "desk calculator" mode can perform once-only calculations or serve as an aid in debugging.
MISCELLANEOUS PROGRAMS: Dump prints contents of files in any of several useful formats. SRCOM compares two files, prints summary of differences.
The easy-to-use HT-11 Operating System for the H27 Floppy Disk System extends the H11/H11A's capabilities. Minimum requirements include an H11 or H11A Computer with at least 16K words of main memory, a console terminal and interface, and a Heathkit floppy disk drive, controller and interface.
*HT-11 Operating System with BASIC, Shpg. wt. 12 lbs. 350.00

FORTRAN for HT-11 System. Binary software features complete ANSI standard 1966 FORTRAN IV with extensions for increased speed. Some of the extensions include: relaxation of statement ordering, use of expressions nearly anywhere, direct access I/O, TYPE ACCEPT and PRINT I/O statements, ENCODE and DECODE statements, END and ERR parameters, random number generator, IMPLICIT statement, more.
*HT-11-1, Shpg. wt. 9 lbs. 250.00

*NOTE: The HT-11 Disk Operating System and HT-11-1 FORTRAN are compatible only with the Heath H27 or WH27 Floppy Disk Systems. To obtain this software, the Customer Software Sublicense Grant must be signed and you must include the make, model and serial number of your CPU in the blank provided on page 82 and include the Grant with your order.

See pages 82 and 83 for our full selection of operating applications software

79

The Heathkit H19 Smart Video Terminal has features like professional keyboard and super-sharp CRT display

$675.00 Kit

- Z80 microprocessor-based for fast, efficient data handing
- Extremely wide bandwidth monitor for easy-to-read images
- Full professional keyboard in typewriter format
- Prints complete ASCII set including upper and lower case characters, and special graphic symbols

Look at these professional features:

- Eight separate user-definable function keys
- Separate numeric keypad
- Standard typewriter format
- Heavy-duty keyboard
- Addressable blinking cursor
- Bright, easy-to-read 12″ diagonal CRT
- DEC VT-52™ compatible

Powerful Heathkit H19 "Smart" Video Terminal for a multitude of high-speed functions

The H19 Video Terminal is a top-of-the-line general-purpose peripheral designed for use with the Heathkit H8 and H11A computers or with any EIA RS-232 Standard interface. Its powerful Z80 microprocessor makes it ideal for high-speed data handling.

The typewriter format lets you start right in programming from the keyboard. The terminal's 32 separate functions can be controlled from keyboard or computer. A 12-key numeric pad in calculator format makes entry of arithmetic programs fast and easy. Baud rates of up to 9,600 are keyboard selectable for easy changes. Eight user-function keys give you an extra measure of flexibility. The H19 prints the entire ASCII character set, including upper and

lower case letters. The print format is 24 lines by 80 characters (with software controlled 25th line). Addressable blinking cursor lets you make corrections or edit anywhere on the screen. Reverse video lets you emphasize any portion of the screen by reversing white on black.

The big 12″ diagonal CRT has outstanding resolution for a bright, clear readout. The terminal also displays 33 different graphic characters that can be arranged for a variety of graphic displays and effects.

Kit H19, Shpg. wt. 49 lbs. 675.00
Factory Assembled and Tested Version of above.
WH19, Shpg. wt. 43 lbs. 995.00

H19 SPECIFICATIONS: CRT: 12″ Diagonal, P4 phosphor. **Display Size:** 6½″ high x 8½″ wide. **Character Size:** 0.2″ high x 0.1″ wide (approx.). **Character Set:** 128 characters (95 ASCII and 33 graphic). **Character Type:** 5x7 dot matrix (upper case), 5x9 dot matrix (lower case with descenders). **Keyboard:** 80 keys (60 alphanumeric, 12 function) plus a 12-key numeric pad. **Cursor:** Blinking, non-destructive underline. **Cursor Controls:** Up, down, left, right, home, CR, LF and tab. **Cursor Addressing:** relative and direct. **Tab:** standard 8-column tab. **Refresh Rate:** 60 Hz. **Erase Functions:** erase page, erase to end of line, erase to end of page. **Scroll:** auto or line/page freeze. **Bell:** audible alarm on receipt of control G. **Video:** normal and reverse using an escape sequence. **Interface:** EIA RS-232C at 110 to 19,200 baud. **Communications Mode:** full or half duplex. **Parity:** even, odd, stick or none. **Power:** 120/240 VAC, 60/50 Hz, 45 W. **Dimensions:** 13″ H x 17″ W x 20″ D.

Save $100 on H9 CRT Video Terminal and Keyboard

Displays twelve 80-character lines. Has auto-scrolling, plot and erase modes, automatic line carryover, cursor, built-in speaker. Serial interface provides EIA RS-232C levels, 20 mA current loop, TTL levels. Parallel interfacing includes TTL levels, 8 bits input, 8 bits output, 4 handshaking lines. 120/240 VAC, 60/50 Hz. 12½″ H x 15⅝″ W x 20¾″ D.
Kit H9, 50 lbs. . . . . Was $479.00, Now 379.00
Adapter Cable. Interface H9 with other devices.
WH9-1, Shpg. wt. 1 lb. 15.00
80

Assembled Cassette Recorder/Player

Ideal for data storage

This Heath-recommended assembled Cassette Recorder/Player is ideal for data storage use with computers. Features volume and tone controls, push-button select of record, play, rewind, fast forward, stop, eject. Also has built-in 3-digit counter with reset button. Factory wired; not a kit.
ECP-3801A, Shpg. wt. 4 lbs. 60.00
Heath-recommended high output, low noise, premium grade audio recording tape. Pack of three 30-minute blank cassettes.
ECP-3802, Shpg. wt. 1 lb. . . . . .per pack 6.00

Acoustic Modem

Ideal for any phone

Cat Modem by Novation lets your computer talk to other computers over standard telephone lines. Designed especially for the small computer, it features selectable originate and answer modes. LED display of unit status and special acoustic self-testing. Compact, powerful. Plugs directly into wall sockets. Data exchange occurs at any speed up to 30 characters per second, via standard EIA-RS-232C interface. The ideal computer communications link. Many practical and fun applications. Fully assembled.
WH13, Shpg. wt. 3 lbs. 195.00

Printers: from low-cost matrix to letter quality font

Popular LA36 DEC Writer II provides sharp "hard copy" printout for your computer

Fully assembled!

Prepaid shipment!

$1495⁰⁰

Sensational low mail order price!

Fast and reliable, the H36 is an advanced technology teleprinter featuring a 7 x 7 dot matrix print head; switch selectable 10, 15 and 30 cps printing speeds. Handles variable width forms from 3" to 14⅞"; adjustable left and right hand tractors half or full duplex operation; ANSI-standard multi-key rollover; typewriter-like keyboard. Prints 10 characters per inch horizontal spacing, 6 lines per inch vertical. Compatible with all Heathkit Computers and most others. With 20 mA current loop I/O, connecting cable and integral stand.

The H36 (LA36 DEC WRITER II) is shipped Motor Freight, prepaid to your nearest terminal in the Continental U.S. **H36 DEC Writer II**, For 120 VAC, 60 Hz **1495.00**
H36-1 Fan-fold Paper for H36. Standard 14⅞" x 11" white and green, single-part, lined paper. 3200 sheets per carton. **H36-1,** Shpg. wt. 47 lbs. **30.00**
H36-2 EIA Interface. Provides EIA RS232-C Interface for LA36, 9-ft. cable with 25-pin data-set type connector. Required to operate H36 with H88 and H89 Computers. **H36-2,** Shpg. wt. 1 lb. **65.00**
H36-3 Acoustic Coupler. Provides hookup to phone lines for time-sharing. Kit **H36-3,** 10 lbs. **250.00**
H36-4, Ribbon Accessory, Shpg. wt. 7 lbs. **15.00**
DEC is a registered trademark of Digital Equipment Corp.

Low-cost H14 Line Printer gives you permanent copies of your programs

$625⁰⁰ Kit

- One of the lowest-cost microprocessor-based printers
- Use with most computers

The H14 prints standard 96-character ASCII set (upper and lower case) on 5/7 dot matrix print head. Uses readily available 0.5" wide nylon inked ribbon on 2" spools. Maximum instantaneous print speed is 165 CPS with selectable line length of 80, 96 or 132 characters. 6 lines per inch spacing with 8 lines per inch software selectable. Baud rates selectable from 110-4800. Adjustable width sprocket feed handles edge-punched fan-fold paper from 2.5" to 9.5" wide.

The H14 connects to the H8 or H11A computer by the use of a standard (RS-232C) serial interface or 20 mA current loop. Handshaking is provided by a busy control signal. Includes 25-pin male EIA connector and a matching paper catch.

Get the extra features you need the most — at a price the others still can't match.

The H14 is supplied in kit form or fully assembled and factory tested. 4⅘" H x 18⅓" W x 14⅓" D. 120/240 VAC, 50/60 Hz. Requires H8-17, H8-18 or HC8-14 software for H8; HT-11 or H11-18 software for H11 or H11A.
Kit H14, Shpg. wt. 30 lbs. **625.00**
WH14, Assembled version of above. Shpg. wt. 27 lbs. **895.00**
H14-1, 3200 sheets 9½" x 11" Fan-Fold Paper for use with H14. 31 lbs. **30.00**

Compact, Versatile DEC Desktop Computer Teleprinter

Convenient desktop design makes the LA34 ideal for office uses

Desktop teleprinter prints the full 128 character ASCII set with switch selectable 110 and 300 baud rates. Offers true 30 cps print speed, adjustable character widths, adjustable line spacing, clear printing through a 9x7 dot matrix head. Designed like a standard typewriter for operator ease and convenience, the LA34 features standard sculptured keyboard, cartridge ribbon change, automatic line feed and more. Includes EIA RS232C interface cable, ribbon and paper. 7" H x 22" W x 15½" D. 120 VAC, 60 Hz.
WH34, Assembled and tested, 40 lbs. **1295.00**
WHA34-1, 3 ribbon cartridges, wt. 7 lbs. **30.00**
WHA34-2, Tractor feed accessory. Wt. 9 lbs. **150.00**

Don't compare the Heathkit WH24/TI810 Line Printer with other, incomplete models

$1895⁹⁵

- Unlike others, our price does include upper/lower case, floor stand and paper catch tray

NEW

The WH24/Texas Instruments 810 Line Printer is a high-quality, low-priced line printer that can make an impact on both your printing and your printer costs. It has features you usually don't find at such a low price — like optimized 150 cps bidirectional printing, which minimizes printhead travel time and maximizes efficiency, and vertical and horizontal tabbing, which team with bidirectional printing to produce maximized data, regardless of format.

The WH24 has a 256-character FIFO buffer that lets you receive data at speeds from 110 to 9600 baud. Programmable forms length and a wide carriage can handle multiple-part forms, tickets and reports from 3 to 15 inches in width. And a 9 x 7 dot matrix character font prints clearer, more legible characters of an original, and up to five high-quality copies. The WH-24's adjustable tractor drives make it easier to operate. Once a form has been engaged by the

Fully Assembled!

tractor drives, alignment can be made at the main control panel.

Do not compare with incomplete units elsewhere. WH24 includes upper/lower case, floor stand, paper catch tray. 120/240 VAC. 8" H x 25¾" W x 20" D. Needs WHA11-5 Serial I/O Card for H11/H11A only. Not required with other Heathkit systems.
WH24, Shpg. wt. 97 lbs., Motor Frt. **1,895.00**
WHA11-5, Serial I/O Card, 1 lb. **150.00**

H8/H89 software gives you more ways to use your computer

Whether you're a hobbyist or in business, Heathkit software will help you do your work — or have fun — faster and easier than before. And when you buy any of our disk-based software packages, we'll supply you with any changes that are incorporated into the program for the next year — free of charge, when you sign and return the Customer Software Sublicense Grant.

Microsoft™ BASIC™: the most popular computer language. Microsoft BASIC is one of the most versatile languages for the personal computer. Scores of programs are written in this BASIC. Microsoft BASIC features the following capabilities: Direct access to CPU ports and memory locations (INP, OUT, PEEK, POKE); IF—THEN—ELSE control structure for more highly-structured programming, including editing during programming and random or sequential filing capabilites; Powerful program edit and file management facilities; Powerful string processing functions, including LEFTS, RIGHTS, MIDS, ASC, CHRS and concatenation; Automatic line numbering and renumbering; PRINT USING for control of output formats; ON ERROR command for control of errors.

This software includes a variety of mathematical and logical functions as well, including double precision floating point number and double precision mathematics. Microsoft BASIC requires H8-17 Operating Systems Software for the H17 Floppy Disk System (order at right) and a minimum of 32K memory.

H8-21, Shpg. wt. 3 lbs. **100.00**

Extended Benton Harbor BASIC: super-fast BASIC. Extended Benton Harbor BASIC is an easy-to-learn, easy-to-use conversational computer language. This enhanced version of Dartmouth BASIC includes strings and files. It provides even faster operation and includes character strings, additional convenience commands and math functions, dynamic storage allocation, access to real time clock, keyboard interrupt processing, expanded error messages and recovery ability, LED display control and key pad support.

Extended Benton Harbor BASIC features two different types of data: numeric data with over six digits of accuracy and Boolean values which permit logical operations. It also features free format programs, enhanced expression, math functions and conditional statement facilities.

A minimum of 12K memory is required to run Extended Benton Harbor BASIC.

16K memory is preferred if full use is to be made of its capabilities. Extended Benton Harbor BASIC supports the H14 Line Printer and the H8-4 Four-Port Serial Interface Board. The software is supplied in 1200 baud audio cassette form.

HC8-14, Shpg. wt. 13 lbs. **20.00**

Operating Systems Software Designed Especially for the H8 Computer. Helps you get ready to program your H8 quickly and easily, with features that make it easier to use and more practical than other systems. Automatic command completion simplifies typing, dynamic syntax checking instantly alerts you to errors and a special user configuration lets you personalize your system.

This operating systems software includes: Benton Harbor BASIC, a conversational programming language which makes use of simple English statements and familiar algebraic equations to perform operations and solve problems; HASL-8 Assembly Language, a two-pass absolute assembler that lets you create source programs using letters, numbers and symbols to generate efficient machine language code. It assembles the source program into a listing and an object program in binary format executable by the H8; TED-8 Text Editor, which converts the H8 Computer and terminal into a powerful typewriter for generating text and editing. It prepares the source code for H8 Assembly language and can be used to prepare reports, write letters and edit manuscripts; and BUG-8 Console Debugger, an enhanced and extended version of the front panel monitor which allows entry and debugging of user machine language programs via an external terminal. It features single or multiple stepping through programs, breakpointing, load and dump from tape storage. A user program is required to use the Console Debugger; and a full set of disk utility programs.

A minimum of 8K memory is required to run this software. This operating systems software is supplied in 1200 baud audio cassette form, which requires an H8-5 Serial I/O and Cassette Interface to load.

H8-18, Shpg. wt. 11 lbs. **20.00**

Operating Systems Software for the H17 Floppy Disk System. Includes a diskette with the standard H8 software (Extended Benton Harbor BASIC, a 2-pass absolute assembler, a text editor, a console debugger and a full set of disk utility programs. This software is supplied on a standard diskette.

H8-17, Shpg. wt. 14 lbs. **100.00**

Have hours of excitement and fun with these H8 computer games

Supplied in 1200 baud audio cassette form, requires H8-5 (opposite) to load.

Biorhythm. Plot your body's biorhythm, know when to take on the world and when to stay home. Runs under extended BASIC, requires 16K RAM.

PA-82, 1 lb. **10.00**

Space War. Guide, control and command the starship Enterprise as it travels

through the galaxy. Requires 24K RAM. **PA-83,** Shpg. wt. 1 lb. **10.00**

Game Set #1. Lets you play 8 popular computer games, including Craps, Orbit, Tic-Tac-Toe, Nim, Hexapawn, Hangman, Hamrabi and Derby. Requires 8K or more RAM. These games will provide hours of entertainment. **PA-84,** 1 lb. **10.00**

computer system more versatility than ever before

Accessories give your H8 computer more capability

Use any or all of these accessories to expand the capability of your H8 Computer and make your system even more versatile.

WH8-16 16K Wired Memory Board. This board lets you expand your H8 Computer to the full capacity of the 8080A CPU. Fully assembled and tested, and factory burned-in to eliminate memory problems.
WH8-16, Shpg. wt. 2 lbs. **395.00**

WH8-8 Fully Assembled and Tested 8K Memory Board. 8K x 8 memory card, supplied with 8K of memory. Plugs directly into H8 bus. Features maximum storage capacity of 8192 8-bit words. Uses modern 4K x 1 static memory IC chips. Access time is less than 450 nS. With on-board regulators, heat sinks and full buffering. Factory assembled and tested.
WH8-8, Shpg. wt. 2 lbs. **175.00**

H8-2 Parallel Interface. Use this parallel interface to connect your H8 Computer to any parallel device, such as printers which accept parallel I/O. Features three independent parallel ports, each with 8 bits input and 8 bits output, as well as universal handshaking capability. Compatible with all Heathkit software.
Kit H8-2, Shpg. wt. 3 lbs. **150.00**

H8-4 Four-Port Serial Interface. The H8-4 is recommended to interface your H8 Computer and H19 CRT Terminal to the H14 Line Printer. All four serial ports support a standard RS-232C interface, including MODEM controls. One port is switch programmable for a 20 mA serial loop. Baud rate is software programmable. All ports feature solderless addressing and vector interrupt jumpers for easy setting. Also has interface connector for DCE and DTE modes. Includes one WH8-41 cable to facilitate connection to line printers, such as the Heathkit H14.
Kit H8-4, Shpg. wt. 2 lbs. **150.00**

Factory Assembled and Tested Version of Above.
WH8-4, Shpg. wt. 3 lbs. **250.00**

Adapter Cable for Use with H8-4 Four-Port Serial Interface. Provides EIA industry standard electrical and mechanical interface between H8-4 Four-Port Serial Interface and other peripherals.
WH8-41, Shpg. wt. 1 lb. **15.00**

H8-5 Serial I/O and Cassette Interface. Cassette interface with one serial I/O port for control terminal. Connects your H8 Computer to serial devices such as the H36 DEC Writer II. Also connects the H8 Computer to a cassette recorder/player mass storage device, such as the ECP-3801A. Features jumper selectable data rate from 110-9600 baud, plus common input/output interfaces — including 20 mA current loop and EIA RS-232C compatible levels. Cassette interfaces uses the popular Byte/Manchester recording format, but runs at 1200 baud. NOTE: A second H8-5 Serial I/O and Cassette interface cannot be used to connect the H8 Computer to the H14 Line Printer. The H8-4 Four-Port Serial Interface is recommended for H8 Computer systems not using cassette data storage.
Kit H8-5, Shpg. wt. 3 lbs. **95.00**

Factory Assembled and Tested Version of Above.
WH8-5, Shpg. wt. 2 lbs. **120.00**

Adapter Cable for use with H8-5 Serial I/O and Cassette Interface. Provides EIA industry standard electrical and mechanical interface between H8-5 and other peripherals. For use with H8 Computer. Factory assembled and tested.
WH8-51, Shpg. wt. 1 lb. **15.00**

H8-7 Circuit Design Breadboard Card. The H8-7 lets you custom design your own analog or digital circuits for additional interfaces or creating your own memory board. This circuit design breadboard card uses solderless breadboard sockets, also provides address decoding and bus buffering. A 5 VDC power supply for logic circuits is provided on the board. Experimental circuits may be torn down easily and the H8-7 may be easily re-used — or permanent circuits may be created.
Kit H8-7, Shpg. wt. 2 lbs. **90.00**

Examine the manuals first. Here's a chance to look before you buy — with no risk. The HM800 Manual Set includes complete assembly and operations manuals for the H8 Computer, H8-4 Four-Port Serial Interface, H14 Line Printer, WH8-16 16K Wired Memory Board, H19 CRT Terminal and H8-17 Operating Software. Then, deduct $25.00 from the purchase price (not including shipping and handling charges) when you order an H8 Computer.
HM800 Manual Set, Shpg. wt. 11 lbs. **25.00**

NOTE: Individual product manuals are included with each kit.

H11A accessories, software and interfaces add flexibility

Modification Kit for H11/WH11 and H11A/WH11A Computers. This special modification kit places the line time clock switch on the front panel for easier access. It's easy to assemble and includes an entirely new front panel.
Kit 830-35, Shpg. chgs. prepaid **53.50**

4K Memory Expansion Module. This module plugs into the backplane of the H11 or H11A Computers. It adds 4K x 16-bit word capacity to memory. Uses high-reliability 1K x 4 static MOS RAM chips. Access time is less than 500 nS. Module contains decode circuitry for operation on 4K address boundaries, and has a handle for easy installation and removal.
Kit H11-1, Shpg. wt. 2 lbs. **125.00**

Assembled and tested version of 4K Memory Expansion Module.
WH11-1, Shpg. wt. 2 lbs. **150.00**

Parallel Interface. A general-purpose parallel interface featuring 16 diode-clamped latched data input lines, 16 latched output lines, 16-bit word or 8-bit byte data transfers. Has LSI-11 bus interface and control logic for interrupt processing and vectored addressing. Control status registers are compatible with PDP-11 software routines. Four control lines for output data ready, output data accepted, input data ready and input data accepted logic operations. Maximum data transfer rate, 90K words per second under program control. Maximum drive capability, 25 ft. cable. Also compatible with TTL and DTL logic devices.
Kit H11-2, Shpg. wt. 2 lbs. **95.00**

Assembled and tested version of H11-2 Parallel Interface.
WH11-2, Shpg. wt. 1 lb. **150.00**

Serial Interface. Universal asynchronous receiver/transmitter serial interface module for use between LSI-11 bus and serial devices, such as the Heathkit H9 Video Terminal (see page 80) and the H36 DEC Writer II (see page 81). Has an optically isolated 20 mA current loop or EIA interfaces, selectable baud rates of 50 to 9600. Plugs into H11 backplane, fully compatible with PDP 11/03 and other LSI-11 backplane machines. Supplied with all mating connectors.
Kit H11-5, Shpg. wt. 2 lbs. **105.00**

Assembled and tested version of H11-5 Serial Interface.
WH11-5, Shpg. wt. 1 lb. **150.00**

Adapter Cable for H11-5 Serial Interface. Provides EIA industry standard electrical and mechanical interface between H11-5 Serial Interface and other computer system peripherals. For use with H11/H11A computers. Fully assembled and tested. WH11-51, Shpg. wt. 1 lb. **15.00**

16K Memory Module. Provides 16K dynamic MOS random access memory on a 5" x 8½" board. Has on-board refresh, cycle time of 570 nS and access time of 250 nS. Fully assembled and tested. Fully expand memory with only two of these boards! Maximum memory capacity of H11A is 30K words.
WHA11-16, Shpg. wt. 2 lbs. **480.00**

32K Memory Module. Provides 32K words dynamic MOS random access memory, with same 570 nS cycle time and 250 nS access time as WHA11-16 16K Memory Module above. Fully assembled and tested. Fully expand memory with just a single board! Maximum memory capacity of H11A is 30K words.
WHA11-32, Shpg. wt. 2 lbs. **995.00**

H11-6 Extended Arithmetic Chip. Adds powerful arithmetic instructions to the LSI-11, including fixed point multiply, divide and extended shifts, plus full floating point add, subtract, multiply and divide. Helps minimize arithmetic subroutines. And the H11-6 saves memory space, too. The 40-pin dual-in-line package integrated circuit (IC) plugs into a socket on the H11/H11A board.
H11-6, Shpg. wt. 1 lb. **159.00**

Look over the Manuals before you buy. Complete manuals for H11A Computer, H11-1 4K Memory Board, H11-2 Parallel Interface, H11-5 Serial Interface and H19 Video Terminal. Also includes complete software documentation. Get a first-hand look at the accurate, easy-to-follow assembly manuals that take you, step-by-step, from unpacking to final plug-in. Know your H11A Computer inside out before buying. And when you buy an H11A Computer, we'll deduct $25.00 from the purchase price. HM-1100 Manual Set, Shpg. wt. 12 lbs. **25.00**

HUG has over 400 exciting programs for your computer

Heath User's Group

The Heath Users' Group keeps you up to date on happenings in the Heathkit personal computing world. There's an informative magazine, a complete program library and exchange, new product information and new computing ideas — all at your disposal when you join HUG!

HUG gives you all these advantages:

- A one-year subscription to REMark, the quarterly HUG magazine
- An attractive three-ring HUG binder to hold your magazines, software documentation and other materials
- Forms to submit your own programs to HUG
- The official HUG Identification Card
- Access to the HUG Software Library, which includes over 400 user-submitted programs — including special utility routines, computer-aided instruction, financial packages, amateur radio applications programs, games and much more! See a more complete list of HUG programs below, right.

Only HUG — the Heath Users' Group — can give you all the advantages above and much, much more! HUG puts you in contact with other Heathkit computer owners. In fact, many HUG members are forming local groups to increase the benefits of belonging to HUG. These benefits include:
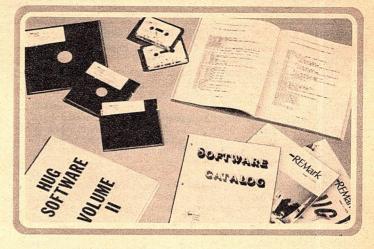
Your own one-year subscription to REMark, the quarterly magazine of HUG that updates you on the latest Heathkit computer product developments and lets HUG members share new hardware modifications, software enhancements, applications programs and other materials with other HUG members.

A three-ring, loose-leaf HUG binder loaded with information that helps you get the most from your membership in HUG, and gives you a place to store software documentation and back issues of REMark magazine, as well as other materials. **HUG program submittal forms** that enable you to share your unique programs with other HUG members by submitting them to the HUG Software Library.

An opportunity to compete for valuable prizes in HUG software contests.

The official HUG Identification Card, which entitles you to all of the special benefits that are available only to HUG members.

And access to the huge HUG Software Library, a constantly updated and expanded library which now has more than 400 user-submitted programs. Imagine between 30 and 80 programs on a tape for nominal reproduction and distribution cost. Software documentation and disks are also available. The HUG Software Library includes a diversified collection of programs, subroutines and procedures written by members of the Heath Users' Group. Whether you're an amateur radio buff, a businessman or just interested in playing games, you find a program for you in the HUG Software Library. The contents of the HUG Software Library, including computer-assisted instruction, business applications, personal finance programs, amateur radio programs and games, are described in the HUG Software Library Catalog, which is part of the initial HUG membership package. Each HUG Software Library program is listed by its author, program name, a short description of the program, language, version and equipment required to run the program.

If you like what you've seen of HUG so far, check out this partial list of program titles from the HUG Software Library:

- Accounts Receivable
- Payroll
- Inventory
- Tax Program
- Declining Interest
- Mortgage Tables
- Loan Amortization
- Accounts Payable
- Real Estate Depreciation
- Small Business Package
- Home Budget Maintenance
- Personal Accounts Payable
- Checkbook Programs
- Finance
- Credit Card Management
- Peak Budget Demand
- Depreciation Calendar
- Stock Reporter
- Stock Market Game
- BASIC Tutor
- Space Wars
- Star Trek
- Biorhythms

- QSL File Maintenance
- Loop Antenna Designer
- Antenna Designer
- Handy Ham Problem Solvers
- Power Supply Design
- Op-Amp Circuit Design
- Morse Code Review
- RTTY Send/Receive
- Solid-State Amplifier Design
- Weather Forecasting
- Disk Transfer Systems
- BASIC Renumbering Programs
- Create-A-Program
- Interactive Data Base
- Word Processor
- 8080 Emulator
- CHI Square Multisort
- Octal/ASCII Dump
- File Maintenance
- Modem Drivers
- Pilot
- Blackjack
- Football

HUG membership application information and details are included with your Heath computer — or write HUG Membership, Hilltop Road, St. Joseph, Michigan 49085. H11 owners are also eligible for membership in DECUS, the Digital Equipment Computer Users' Society.

Learn to speak your computer's language

Heathkit Self-Instruction Program for Assembly Language computing

$49.95

- Use the full capacity of your computer system
- Execute your computer programs faster
- Store more information in less space

Heathkit Self-Instruction Program for BASIC Language computing

$39.95

- BASIC — the easiest of all languages to write
- Now BASIC is one of the easiest languages to learn
- Hundreds of programs are available in BASIC

Assembly Language is the most powerful language that can be used on any computer. Anything that can be done in any other language on a particular computer system can be done in Assembly Language.

Assembly is a true programming language, not just a convenient notation for machine code. The use of labels, computed operands, comments and assembler directives allows the Assembly Language programmer to create a source code that is adaptable to the system and easily read. Assembly includes a mnemonic for every machine operation. There is no need for programmed memory, no time wasted in interpreting. So your programs run much faster.

You can use your computer system's memory more efficiently when you use Assembly Language. It stores more data in less space because codes are shorter and more explicit. By using computed origin statements and other assembler directives, you can make an Assembly Language program operate wherever the computer has space. The use of meaningful labels for subroutines, along with as many remarks or comments as you desire, make a program listing quite readable in Assembly Language.

One of the most important and useful requisites of a programming language is that it be flexible, not dependent upon specific addresses and hardware of the computer. In an Assembly Language program, hardware specifications can be made at the beginning of the program and referred to symbolically through the rest of the program. In this way, changes can be located together — easily.

The Heathkit Assembly Language Self-Instruction Program teaches you to program your computer in Assembly Language. You learn the details at your own pace, through a special 400-page text designed for self-study. An exercise workbook provides hands-on experience with programming exercises — you perform each exercise on your own computer system. The programmed instruction text and workbook are so thorough that you can learn to program your computer by studying the text and test questions. To perform the optional experiments, which are necessary for gaining the full benefit of the Heathkit Assembly Language Self-Instruction Program, you must have a computer and for Z80 computers (the 8080 instruction set is essentially a subset of the Z80 instruction set).

The Heathkit Assembly Language Self-Instruction Program is designed for computers using the popular 8080/8085 microprocessor series, which uses standard Intel 8080 mnemonics. This includes the Heathkit H8, H88 and H89 Computers.

Along with the programmed instruction text and workbook, the Assembly Language Program also includes a special Reference Placard, which contains all 244 assembly instructions for easy reference. The other side of the Reference Placard contains the ASCII code chart. If you decide to take the optional final examination and pass with a score of 70 percent or better, you will earn a Certificate of Achievement and 6.0 Continuing Education Units (CEUs).

With the Heathkit Assembly Language Self-Instruction Program, it's never been easier or more fun to learn the most versatile, most powerful computer language.

Now is the time to learn the computer language that puts you in command of your computer's full potential.

Send today for the Heathkit Assembly Language Self-Instruction Program.

EC-1108, Shpg. wt. 7 lbs. 49.95

More computer programs are written in BASIC Language than any other computer language. It's the easiest computer language to write — and the easiest computer language to learn.

BASIC — uses familiar English words which cause the computer to perform standardized operations. When a number of these words are strung together to form a program, the computer performs each of the specified operations in turn to complete whatever task the operator desires.

When you know BASIC Language, you can adapt and run hundreds of existing computer programs to meet your specific needs. You can exchange computer programs with others. And you can write your own original programs.

The Heathkit BASIC Language Self-Instruction Program covers all BASIC Language versions, formats, commands, statements and procedures, plus special problem-solving tips that you can use when you write your own computer programs. In the two sections of the Heathkit BASIC Language Program, which are divided into a total of 14 easy-to-follow programmed instruction segments, you will learn all of the standardized words of the BASIC Language, and you'll understand the operation that each word causes the computer to perform. You will get a grasp upon the tools of BASIC Language computer programming, including the numbers, statements, functions, loops, lists, arrays and strings.

The Heathkit Self-Instruction Program will help you understand the importance of proper syntax in BASIC programming, and why the computer needs another program that can interpret the words it reads and perform the desired operations.

The second part of the Heathkit BASIC Language Self-Instruction Program teaches you the creative aspect of writing a computer program. Using the tools you learn in the first section, you'll participate in the decision-making factors that are part of writing a meaningful computer program, one that really does something. The Program will teach you useful computer programming techniques, such as how to define and plan a program, how to format and write a computer program in BASIC Language and how to adapt existing programs to suit your needs.

The course material includes a textbook which explains the BASIC Language, using a technique called programmed instruction. This teaching method makes sure you completely understand the information presented in the text. A special workbook provides programming instructions and experiments that you can perform on your own computer.

Also included with the Program are handy reference cards for Benton Harbor BASIC Statements, ASCII number codes, BASIC direct command statements and a reference chart for math and Boolean algebra operations.

While the BASIC program is keyed to Heathkit computers, it's equally applicable to any computer system using BASIC. And with our BASIC Language Program, a computer language has never been easier or more fun to learn.

Passing the Program's final exam (70% or better score) will earn you a Certificate of Achievement and 3.0 Continuing Education Units (CEUs).
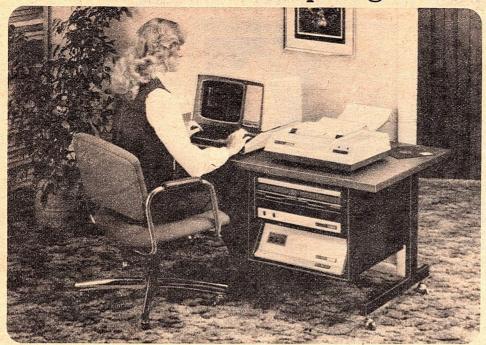
Until you know BASIC, you're missing the full selection of computer programs available to you. Begin the Heathkit BASIC Language Self-Instruction Program today.

EC-1100, Shpg. wt. 7 lbs. 39.95

Money-Back Guarantee

The programs on this page carry a complete refund of the purchase price, if you're not satisfied.

85

Accessories make computing easier

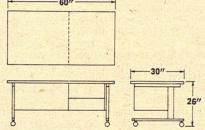## Computer Work Station organizes your computer system, adds efficiency

$295.00

- Organizes your computer system in less space
- Components are easily accessible
- Easy-to-clean desk top
- Rugged metal construction

Heath's Computer Work Station organizes your computer system in less space — yet all components are easily accessible! Designed to Heath specifications, the 60" x 30" easy-to-clean formica desk top places I/O's at a comfortable height for seated operators. The lower shelf holds horizontal components. The upper shelf is 8½" H x 20" W x 19¾" D, while the lower shelf is 7" H x 20" W x 19¾" D.

Rugged black steel legs and black sheet metal shelving are designed to last under constant use. Casters make it easy to roll the Computer Work Station from place to place, while caster locks prevent the work station — and your computer system — from rolling away by accident. The PD-11 Computer Work Station keeps your operator comfortable and efficient — puts every one of your computer system components within easy reach — and its rugged but handsome appearance make it an attractive addition to every office environment.

PD-11, Shpg. wt. 95 lbs., Motor Frt.,
FOB El Segundo, CA 295.00

Multi-function calculator for the computer hobbyist

- Versatile three-key independent memory for complex problems
- Special logic operation for computer applications
- Fifteen levels of parentheses for involved calculations

Designed especially for the computer hobbyist, this fully assembled Texas Instruments Programmer/Calculator features fast conversions between octal, decimal and hexadecimal number systems; logic operations; versatile 3-key independent memory and 15 levels of parentheses for complex problems; constant mode to simplify repetitive calculations; and an 8-digit LED display. Lightweight, ideal for any computer application. Rechargeable battery and AC adapter/charger are included. Factory tested. 5½" H x 3" W x 1¼" D.

PC-11, Shpg. wt. 2 lbs. 59.95

Heathkit Metal Locators let you join in the fun

Experience the excitement of treasure hunting — anywhere

Heathkit Metal Locators punch through the ground clutter and search for old coins, artifacts, treasure — any metal object you want to find. Our finest Metal Locator features a Very Low Frequency (VLF) Ground Balance Mode. You can use it almost anywhere — even in highly mineralized soil where conventional metal locators are useless. And our lowest-priced locator uses an induction balance system that helps you pinpoint your find. Buy one now — and get in on the fun of treasure hunting.

[1] **Groundtrack™ Metal Locator — useable in most soil conditions.** Our finest Metal Locator — the Heathkit Groundtrack — will give you hour after hour of fun-filled excitement. Whether you're searching for buried treasure, antique artifacts or old coins, you'll be a step ahead — because the Groundtrack's adjustable discrimination lets you look in areas where high "junk" content makes the use of conventional locators fruitless.

A fully-shielded search coil prevents false signals and is waterproof, so you can even look for buried metal in up to 2 feet of fresh or salt water. The GD-1290 features a sophisticated induction balance system — you don't hear anything until a piece of metal enters the search field; then the tone grows louder as you approach the metal.

Use the Groundtrack anywhere — it's lightweight — and the adjustable shaft telescopes for easy storage. Operates on 6 AA cells (not included) — or with the optional GDA-1190-1 Nickel-Cadmium Battery Pack installed, you can recharge the GD-1290 at home, or in the field from your car's cigarette lighter socket.

Kit GD-1290, Shpg. wt. 5 lbs. **189.95**
GDA-1190-1, Rechargeable Battery Pack, Shpg. wt. 2 lbs. **17.95**

GD-1290 SPECIFICATIONS: Sensitivity: Locates dime at 4″ to 6″ typical, may be less depending on soil conditions, mode of operation and amount of discrimination selected. **Method of Detection:** Induction-balance circuit. **Detector Output:** Meter, speaker, phone jack. **Dimensions:** Search Coil: 6″ diameter. Extended Height: 45½″. Collapsed height: 22½″. **Power Requirement:** Six AA dry cells or alkaline, or optional rechargeable Nickel-Cadmium Battery Pack (GDA-1190-1, see above). **Net Weight:** 3.4 lbs.

[2] **Cointrack™ Metal Locator designed for coinshooting.** The GD-1190 is the locator to have when you're interested in coins. It features a search coil optimized for coin locating and adjustable discrimination so incredibly good you'll be finding treasure in areas where high "junk" content makes operation with other locators all but impossible! Pushbutton tuning maintains maximum sensitivity — effortlessly. And for shallow water searching, the 1190's waterproof head won't leave you out of the action. Weight is minimal and to cut fatigue even more, an adjustable shaft is provided for maximum comfort.

The GD-1190 collapses for easy storage and transportation. And with its optional GDA-1190-1 Nickel-Cadmium battery pack installed, you can recharge the GD-1190 Cointrack Metal Locator at home, or in the field from the cigarette lighter of your car! It can also operate on six ordinary AA cells (not included). An outstanding value, and an easy and fun kitbuilding experience too.

Kit GD-1190, Shpg. wt. 5 lbs. **149.95**
Rechargeable Nickel-Cadmium Battery Pack. For GD-1190 or GD-1290. Lets you recharge the Heathkit GD-1190 or GD-1290 metal locators at home from an AC outlet or in the field, from the cigarette lighter of your car.
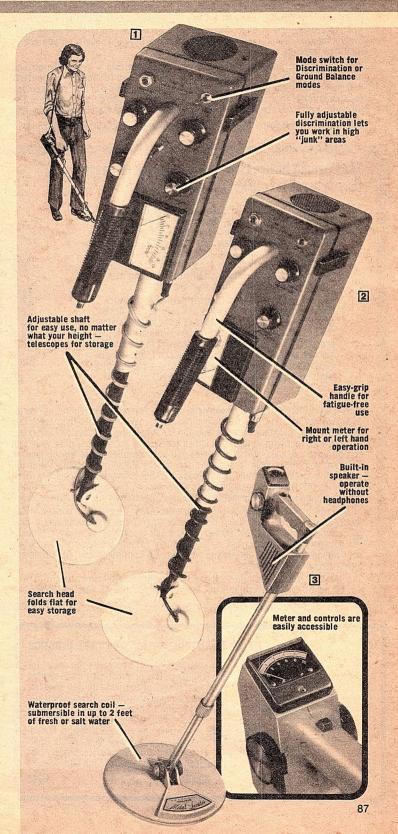**GDA-1190-1**, Shpg. wt. 2 lbs. **17.95**
GDA-1190-2, Headphones. For GD-1190, 1290, Shpg. wt. 2 lbs. **11.95**
GDA-1190-3, Carrying Case. For GD-1190, 1290, Shpg. wt. 1 lb. **11.95**

GD-1190 SPECIFICATIONS: Sensitivity: Typically 4″ to 6″, may be less depending on coin size, amount of discrimination and soil material. **Method of Detection:** Off resonance type. **Output:** Meter, Speaker, Phone Jack. **Dimensions:** Search-Coil: 6″ diameter. Overall length: Shaft extended 45½″, collapsed 22½″. **Power Requirement:** Six — AA Dry Cells or Alkaline, (GDA-1190-1) or rechargeable Nickel-Cadmium battery pack. **Weight:** 3.4 lbs.

[3] **Low-priced Induction Balance Locator finds any metal.** The GD-348 uses a sophisticated induction-balance system. Listen through its built-in speaker, optional headphones or use the front-panel meter to pinpoint your find. The GD-348 has null and ten-turn sensitivity controls that let you adjust it to find smaller or larger objects or overcome ground effects. The shaft telescopes and the search coil folds flat for easy storage. Less battery (order below).

Kit GD-348, Shpg. wt. 5 lbs. **79.95**
GDA-48-1, 9-volt battery. Shpg. wt. 1 lb. **3.25**
GD-396, 600-ohm Superex headphones, Shpg. wt. 2 lbs. **6.95**
GDA-348-1, Carrying case, Shpg. wt. 2 lbs. **11.95**

Mode switch for Discrimination or Ground Balance modes

Fully adjustable discrimination lets you work in high "junk" areas

Adjustable shaft for easy use, no matter what your height — telescopes for storage

Easy-grip handle for fatigue-free use

Mount meter for right or left hand operation

Built-in speaker — operate without headphones

Search head folds flat for easy storage

Meter and controls are easily accessible

Waterproof search coil — submersible in up to 2 feet of fresh or salt water

Amateur Radio and Heath give you the greatest hobby yet

Amateur Radio is a hobby everyone can enjoy. Man, woman, child or senior citizen, there are no barriers to the two-way communication potential of Amateur Radio. And Ham Radio is versatile. You can communicate with the world right from your home, car or boat . . . or even on a back-pack trip into the wilderness. Every time you "work" your equipment, transmitting and receiving, you are in for a new, exciting adventure.

You can combine Amateur Radio with your other interests — get on the air and have a "QSO" with a group of Hams who share your love for boating, computers, R/C modeling . . . any subject under the sun. And, speaking of the sun, perhaps experimenting with a solar-powered QRP rig is an area you'd like to explore. The ways you can enjoy the exciting world of Amateur Radio are virtually unlimited.

Besides giving pleasure to hundreds of thousands, Amateur Radio provides a valuable service in times of emergency. Often when normal means of communications have been disrupted by earthquake, blizzard, tornado or fire, Amateur Radio has provided the vital link that helps protect property and save lives.

In this exciting and worthwhile hobby, we naturally think that starting and pursuing your hobby with Heathkit equipment is the best way to go. That's because our complete line of Amateur Radio equipment can provide everything you need, from a basic Code Practice Oscillator all the way to a sophisticated station.

Heathkit Amateur equipment is easy and fun to build, you learn about circuitry and operation as you put your equipment together, you'll probably save money over comparable assembled units, and you'll even save by being able to perform your own maintenance and service. Read on to see what Heathkit Amateur Radio equipment has for you.

The Heathkit Novice License Program makes it easier for you to get your ticket and get on the air!

From Heath — the world leader in Amateur Radio equipment — here is a self-instruction program that's guaranteed to help you get your Novice ticket. In fact, this program is so effective that if you fail to pass your FCC Novice exam after completing the course, Heath will REFUND your money for the program material. Simply return the program materials to Heath Co. along with a copy of your rejection notice from the FCC.

So . . . if you have been putting off getting your Novice ticket because of fear of failing the code test . . . or the technical exam, or if you just didn't know where to start, the Heathkit Novice License Program is the answer. Everything you need to get your license is in the comprehensive, well-organized package. You can't fail — Heath guarantees that you will pass! Order now — the exciting world of Amateur Radio is waiting for you.

$34⁹⁵

You can get on the air sooner than you think

Now — for CB'ers, electronic hobbyists, anyone interested in operating worldwide two-way Amateur Radio equipment — Heath makes it easier than ever! This deluxe learning program prepares you for the Amateur Radio Novice FCC exam, and provides you with helpful guidelines for setting up and operating your own station once you pass the exam. When you have completed the Novice License program, you will be able to send and receive the Morse code accurately at the rate of five words per minute, and to pass a 20-question, multiple-choice written test from the Federal Communications Commission. The course is organized in 9 separate modules corresponding to the areas covered by the FCC Novice exam.

At the end of each module, a multiple choice exam checks your understanding and retention of the material. After Module 9, two practice exams and a final exam styled after the actual FCC exam give you test-taking experience to make the actual thing a breeze. And, by successfully passing the optional final exam with a grade of 75% or better, you will earn 1.0 Continuing Education Unit and a Certificate of Achievement.

The Novice License Program includes two audio cassette tapes to aid in your Novice ticket. The first contains not only an introduction to Amateur Radio, but also an explanation of RST signal reporting, a review of circuit components, and a review of practical circuits. The second tape teaches you the Morse code in letter groups and then helps you bring your code speed up to the five words per minute required to pass your FCC Novice code test.

In addition, you will receive a set of Operating Aids, plus an attractive 31" x 22" Frequency Spectrum chart and matching U.S. Call Area Map for display on the walls of your Ham "shack." All materials in the Program are packaged in an attractive vinyl binder for convenient reference after you have obtained your license.

ER-3701, Shpg. wt. 7 lbs. **34.95**

Kit HD-1416, CW Oscillator (see below) Wt. 2 lbs. **10.95**

Assembled Cassette Recorder/Player. Ideal for playing the tapes supplied with ER-3701 (above). Features volume and tone controls, pushbuttons for record and play, rewind, fast forward, stop and eject. Factory wired, not a kit.

ECP-3801A, Shpg. wt. 4 lbs. **60.00**

Handy CW Oscillator for your code practice

The ideal way to build up your code speed for the FCC exam, this practice oscillator features a telegraph key, phone jack, built-in speaker, plus volume and tone controls. Once you get your license, the HD-1416 can serve as a side tone oscillator for any transmitter using grid block keying. Dimensions: 2⅝" H x 4⅛" W x 4⅜" D. Operates on a single 9 V transistor battery (not included). Easy-to-build first-time kit.

Kit HD-1416, Shpg. wt. 2 lbs. **10.95**

SAVE
$5⁹⁵

This money-saving package can help you get started in the exciting world of Amateur Radio. Why delay?

We can help you get started in Amateur Radio by saving you money on the ER-3701 Novice License Program (above) and the HD-1416 Code Practice Oscillator (at left) when you purchase the pair together. And to save you even more money, this package even includes a certificate good for a 10% discount on your first purchase of up to $100 worth of Amateur gear from the Heathkit catalog. If purchased separately, the Code Oscillator and Novice License Program would cost you $45.90.

ERS-3701, Shpg. wt. 23 lbs. **39.95**

Heath's General Class Amateur Radio Program will help you move up the ladder in your enjoyment of Amateur Radio

$49⁹⁵

When you upgrade, you open new doors to the full range of Amateur Radio experiences. Leave the crowded Novice or CB bands behind by earning your Technician or General Class License with the help of Heath's ER-3702 General Class Amateur Radio Program. Upgrading has never been easier — it has everything you need.

The ER-3702 General Class Amateur Radio License Program helps you increase your technical knowledge and code skill so you can pass the FCC General Class License or the Technician Class License examination. If you have been putting off going for a higher class license, this is the program for you. It even carries the same money-back guarantee as the Novice Program. Move up to General Class and get all the added privileges it offers — more frequencies to operate on, plus voice transmission, radioteletype, Amateur television and more that you're missing by operating with just a Novice license.

This Program begins to prepare you by providing extra code practice to help you bring your code speed up to 15 words per minute. Since the FCC requires only 13 words per minute to pass the General exam, the extra "two-word edge" this program gives you helps eliminate examination day jitters by giving you the confidence you need to pass the code test with flying colors.

The written section of the License exam has been approached with the same concern for completeness and clarity. An informative text takes you through the subjects covered on the written exam. It is designed to concentrate on the information necessary to pass the exam, so you don't get bogged down by learning information that won't be covered by the FCC examination.

Just as the extra code builds your CW confidence, the program also includes a simulated FCC written exam. Not only does this exam give you the test-taking experience you need to build your confidence, but it also allows you to review any problem areas you might encounter so you will be more fully prepared for the actual exam. When you pass the FCC General exam, send us a copy of your new license or FCC notification of passing to receive 5.0 C.E.U.'s and a Certificate of Completion for the Program. Suitable for hanging on the wall of your shack.

Your General Class License Program will retain its value even after you pass your exam and get on the air. You will want to keep the materials handy as a valuable reference resource. That's easy to do — all materials included in the program are contained in two attractive matching vinyl binders.

Your General License Program is a complete package. In addition to the program text, you will receive:

- Code practice workbook
- Amateur Radio log book
- FCC Form 610
- T.V.I. booklet
- Two code cassette tapes
- Simulated FCC exams
- World call area map
- 5.0 C.E.U.'s
- Certificate of Achievement
- Two vinyl binders
- FCC exam schedule
- FCC rules and regulations

The General Class Amateur Radio Program is composed of 10 separate units arranged in the following manner:

1. Amateur Radio Operations
2. Direct Current
3. Alternating Current
4. Active Devices
5. Electronic Circuits
6. Measurements
7. Transmitters
8. Receivers and Station Operation
9. Antennas
10. Practice Exams

Heath offers you the new General Class License Program with the same money-back guarantee as the popular ER-3701 Novice Learning Program. So confident are we of this Program, that should you fail to pass the FCC Amateur Radio General Class or Technician Class License Exam after completing this program, Heath Company will refund your money for the Program materials when you return them along with your FCC rejection notice.

ER-3702, Shpg. wt. 24 lbs. 49.95

Assembled Cassette Recorder/Player. Extremely useful in listening to the code tapes supplied with ER-3702 (above). This recorder/player features separate volume and tone controls, pushbuttons for play and record, rewind, fast forward, stop and tape eject. The built-in 3 digit counter helps find specific information in a hurry. Factory wired, not a kit.

ECP-3801A, Shpg. wt. 4 lbs. 60.00

Code Courses, Study Guides and Reference Books to help you get more from Amateur Radio

"Tune in the World with Ham Radio". A complete Amateur Radio Course with code practice cassettes and license manual. Produced by the ARRL.
HDP-1142, Shpg. wt. 2 lbs. 7.00

Ameco Junior Cassette Code Course. This tape cassette gives 10 lessons of Morse Code Practice. It takes you from an introduction to code through eight words-per-minute, more than enough to qualify for the FCC Novice or Technician code requirement of five words-per-minute.
HDP-432, Shpg. wt. 1 lb. 4.95

Ameco Senior Code Course. Two LP's with lessons for Code Practice to 18 words-per-minute.
HDP-332, Shpg. wt. 2 lbs. 7.50

Ameco Senior Cassette Code Course. As above, cassettes instead of LP's. HDP-532, Shpg. wt. 1 lb. 8.95

"By the Word" Code Course. Two audio cassettes teach you code using the world-famous "by the word" method. Unique course begins with simple material at 13 words-per-minute, then increasing in complexity, not speed. Develops proficiency in less time than with conventional code course methods.
HDP-132, Wt. 1 lb. 9.95

Amateur Radio License Study Guides. Makes getting your license easy; also serves as a convenient reference.
GENERAL, EDP-123 ....7.95
ADVANCED, EDP-124 ....6.95
EXTRA, EDP-125 ....5.95

US Callbook. Complete listing of Radio Amateurs in all US call areas and territories; SSTV, AMSAT, OSCAR users, Great Circle Bearings, more, 1070 pages.
EDP-126 ....16.95

DX Callbook. Complete listing of foreign Amateurs, addresses, postal rate charts, call zone maps, world time conversion chart, world QSL bureaus, more. 900 pages.
EDP-127 ....15.95

1980 Edition. ARRL Radio Amateur's Handbook. Up to date electronics theory and application. Covers all facets of Amateur operations. 538 pages in new, larger format.
HDP-293 ....10.00

73 Dipole Antennas. Descriptions, construction of 73 different dipole and long-wire antennas. 160 pages.
EDP-180 ....4.95

ARRL Antenna Handbook. Antennas, transmission lines, propagation, antenna design, data on specific designs for HF, VHF, UHF, mechanical construction. 336 pages.
EDP-182 ....5.00

See page 53 for book-ordering information.

For VHF use

NEW

Factory-assembled and calibrated sensor can be mounted in housing or separately

The HM-2140 boasts ±5% average forward power accuracy

For HF use

New HM-2141 Dual Meter VHF Wattmeter lets you monitor forward and reflected power simultaneously between 50 and 175 MHz

$74.95

- Dual meters • ±7.5% Forward power accuracy
- Direct reading SWR • Reads PEP or average power

Heath's new HM-2141 VHF Dual Wattmeter gives you instant power readings. It measures forward and reflected average power, forward and reflected peak envelope power (PEP) and Standing Wave Ratio (SWR) between 50 MHz and 175 MHz. Simultaneous readings of transmitted output up to 30/300 watts forward and 10/100 watts reflected power make antenna tuning a snap. Average forward accuracy is ±7.5%. Reads SWR directly from 1:1 to 3:1. Factory-assembled and calibrated sensor for reliable performance. Operates on 9V battery (not included) or on 120 VAC with the optional GRA-43-1 converter below.

Kit HM-2141, Shpg. wt. 3 lbs. 74.95
PS-2350, AC Adapter for HM-2141, Shpg. wt. 1 lb. 4.95
HDP-3622, 3 ft. coax with connectors. Shpg. wt. 1 lb. 4.95

HM-2141 SPECIFICATIONS: Frequency Range: 50 to 175 MHz. Insertion SWR: less than 1.05:1. Accuracy (full scale): 30 W and 300 W (FWD), 100 W (REF), ±7.5% (AVG), 10 W (REF), ±10% (AVG). Dimensions: 4⅛″ H x 7½″ W x 6⅜″ D.

HM-2140 Dual HF Wattmeter reads forward and reflected power to help you operate your low band station more effectively

$69.95

- Reads PEP or average power • Direct reading SWR
- Factory-assembled and calibrated sensor

Handy wattmeter installs in your transmission line to measure forward and reflected power for frequencies between 1.8 and 30 MHz. It measures transmitter output up to 200/2000 watts PEP in the forward direction and up to 50/500 watts reflected. Has dual meters for forward and reflected power and SWR, ±5% forward power accuracy for precision measurements. High and low power ranges and a factory assembled and calibrated sensor insure accurate readings. Reads SWR directly from 1:1 to 3:1. Also reads PEP or Average power. Operates on 9-volt battery (not included) or 120 VAC with converter below.

Kit HM-2140, Shpg. wt. 3 lbs. 69.95
PS-2350, AC Adapter for HM-2140. Shpg. wt. 1 lb. 4.95
HDP-3622, 3-ft. coax with connectors. Shpg. wt. 1 lb. 4.95

HM-2140 SPECIFICATIONS: Frequency Range, 1.8 to 30 MHz. Insertion SWR: less than 1.05:1. Accuracy (full scale): 200 W and 2000 W (FWD), 500 W (REF), ±5%, 50 W (REF), ±7.5%. Dimensions: 4⅛″ H x 7½″ W x 6⅜″ D.

Solid-state Electronic Code Keyer with selectable word speed

Your CW transmissions will be 100% copy with the HD-1410, because sending code is easy, whether you're operating base or portable. The dot and dash paddles travel and tension are easily adjustable. When the two paddles are treated as one, the HD-1410 operates like a single-paddle keyer with dot and dash memories. Iambic operation forms most characters with reduced wrist movement. Dots and dashes are self-completing and always in proper proportion. During construction, you select the speed range you want — 10 to 35 words a minute or 10 to 60 words per minute. Operates on 120 VAC or 12 VDC. Adjustable side-tone frequency, built-in speaker, headphone jack. Styled to match our famous "SB" line. A special weighted cabinet helps keep the HD-1410 stable to prevent sliding or fumbling. Its low-profile styling and compact size won't block other controls. 3″ H x 5″ W x 7⅖″ D.

Kit HD-1410, Shpg. wt. 4 lbs. 49.95

Value-packed, solid-state Dip Meter covers 1.6 to 250 MHz

Another Heath value — a better dip meter at lower cost. The Colpitts oscillator covers 1.6 to 250 MHz in fundamentals with a MOSFET paraphase amplifier and hot-carrier diodes for more sensitivity and a better dip. It uses a Q-multiplier for greater detector sensitivity and a responsive 150 µA meter movement for positive resonance indications. It includes a phone jack for modulation monitoring. It's sm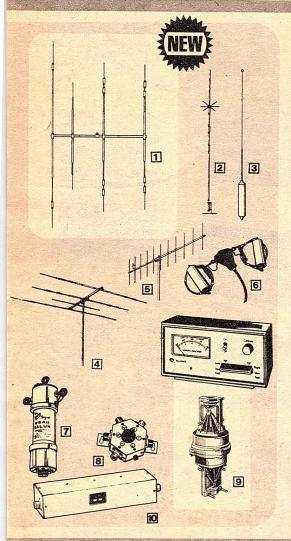aller and lighter than others, too. Whether you're checking resonant frequencies, adjusting traps, looking for parasitics, or using it as a signal generator, the HD-1250 is designed to go anywhere. It fits your hand and thanks to its solid-state design and 9-volt battery operation, it's ready to use instantly wherever you are. Easy to build, too — usually just a single evening. The custom molded gray carrying case protects the meter and the 7 color-coded, pre-adjusted plug-in coils in transit, and makes a handy storage place.

Kit HD-1250, less battery, Shpg. wt. 4 lbs. 59.95

efficiency of your Amateur station

[1] Heath Combination HF Wattmeter/SWR Bridge. This rugged in-line Wattmeter/SWR Bridge features dual power/SWR scales, easy calibration, and extra long interconnect cable to allow you to position the meter up to six feet from the detector/bridge. Operates over the 1.8 to 30 MHz range with minimal insertion loss and a nominal impedance of 50 ohms.
Kit HM-102, Shpg. wt. 3 lbs. **49.95**

HM-102 SPECIFICATIONS: **Frequency Range:** 1.8 to 30 MHz. **Wattmeter Accuracy:** ±10% of full-scale reading. **Power Capability:** 10 to 2000 watts. **SWR Sensitivity:** Less than 10 watts. **Impedance:** 50 ohm nominal. **Connectors:** UHF type SO-239. **Dimensions:** 5 1/16" H x 2 1/4" W x 6 1/2" D.

Kit HM-2102 (not shown), same as above, except 50-160 MHz and 25 to 250 watts. 4 lbs. **49.95**
HDP-3622, 3-ft. RG8U jumper with PL259 connectors, 1 lb. **4.95**

[2] Relative Field Strength Meter. Makes transmitter adjustments quicker and more precise. Provides visual indication that transmitter is radiating a signal and helps you tune transmitter for maximum output. Operates anywhere in the 1.8 to 250 MHz spectrum and is ideal for your HW-8. 2 5/8" H x 4 1/8" W x 4 3/8" D.
Kit HD-1426, Shpg. wt. 2 lbs. **12.95**

[3] Portable Twin Speaker ideal for mobile mounting. The HDP-1228 plugs directly into the external speaker jack of most transceivers, tape players, etc. It's ideal for visor mounting to overcome road and traffic noise, and it can be quickly unplugged and removed from the vehicle for theft protection. Constructed of tough, lightweight plastic. 5 3/4" W x 3 1/4" H x 1 1/4" D. Fully assembled.
HDP-1228, Shpg. wt. 1 lb. **9.95**

[4] Famous Heathkit "Cantenna™" RF dummy load. Use the "Cantenna" to avoid unnecessary interference during tune ups or install it on your bench. Ideal for transmitter maintenance and alignment. Handles up to 1 kW of RF with VSWRs of less than 1.5:1 to 300 MHz and less than 2:1 to 400 MHz. 50 ohm impedance. Oil filled (oil not included).
Kit HN-31, Shpg. wt. 3 lbs. **18.95**
HDP-3622, 3-ft. RG8U jumper with PL259 connectors, 1 lb. **4.95**

[5] Hybrid Phone Patch. Add the versatility of phone patch capability to your shack with Heath's HD-15. Individual receiver/transmitter line gain controls simplify adjustment and the HD-15's VU meter continuously monitors the unit's output and lets you adjust for maximum null depth to produce maximum isolation between the telephone line and your station's equipment. Interfacing with your system is a simple matter. Matches 3-16 ohm speakers and hi-Z or 600 ohm inputs. PTT operation. 2 5/8" H x 9 1/4" W x 3 5/8" D.
Kit HD-15, Shpg. wt. 4 lbs. **39.95**

[6] Heathkit Micoder™ II Microphone/Auto Patch Encoder. Replace your old microphone with the Heathkit Micoder II — a real advance in Ham radio versatility and value. 300-3000 Hz response is tailored for clean voice transmission. Has up to 30 mV rms maximum output for full modulation and push-to-talk bar for conventional one-hand use. Accurate and stable tones for phone calls through repeaters equipped for auto-patch input. Operates on one 9-volt battery (not supplied). Can be used with any transceiver with a high-impedance input. Measures just 3 3/4" H x 2 5/8" W x 1 3/4" D. Comes complete with 6-ft. coiled microphone cable and hanger clip.
Kit HD-1984, Shpg. wt. 1 lb. **39.95**

[7] NEW Fully assembled Heathkit Mobile PTT Mike. Features a high impedance piezo-ceramic element, with 200 to 5000 Hz response with a peak response frequency of 2300 Hz. Sensitivity: −55 ±3 dB below 1 volt per microbar at 1000 Hz. Comes complete with cable and mounting clip. Connector not included.
HDP-1340, Shpg. wt. 1 lb. **14.95**

[8] Fully assembled Heathkit Desk Mike with VOX and PTT. This Hi-Z dynamic microphone features 70-10,000 Hz response, VOX and grip-to-talk operation, and has a rugged die-cast case, finished in grey and satin chrome. The PTT switch can be mounted on the base or handle of the microphone. Includes cables.
HDP-121A, Shpg. wt. 4 lbs. **49.95**

[9] Multiple Outlet Box for Station Equipment. Provides additional electrical outlets for your equipment, helps eliminate long wire runs and messy hookups. Has 12 three-hole outlets, 11 switched and one unswitched. Includes 12 ft. cord.
Kit HD-1274, Shpg. wt. 4 lbs. **16.95**

[10] Frequency Spectrum Chart. Handy wall chart shows detailed breakdown of radio frequency spectrum. Colorful addition to the wall of your Ham shack.
HDP-1495, Shpg. wt. 1 lb. in mailing tube. **4.95**

Antennas and accessories that get your signal out

NEW

[1] New Heathkit SA-7010 4-Element Tri-Band Yagi — easy to assemble, works the world. The new SA-7010 is the easiest-to-assemble Tri-Band antenna ever. An easy-to-follow, Heathkit manual means you can be on the air in as little as 3 to 4 hours.

And once you assemble the compact SA-7010, you'll get excellent performance. Three active elements on each band give you good 8.3 dB actual gain over a dipole on 10, 15 or 20 meters. Front-to-back ratio is 25 dB, minimizing interference. A separate 10-meter reflector assures correct monoband spacing. Energy transfer is more efficient, with a VSWR of less than 1.5:1 at resonance on each band. Full legal power. 15' boom, 31' longest element. 17'5" turning radius. 5.8 sq. ft. wind area.
SA-7010, Shpg. wt. 45 lbs. **219.95**

[2] Hustler 4-BTV Fixed-Station Vertical HF Antenna gives you top performance on 40-10 meters. Rated at full legal power on SSB and CW. Ground mount or tower mount with radials. SWR at resonance, 1.15 to 1 or better. Easy assembly. Height, 21'5".
HDP-3850, Shpg. wt. 15 lbs. **89.95**

[3] Hustler Super Resonator for 75-meter operation with your 4-BTV. Installs on top section of antenna. Adjustable resonance from 3750-4000 kHz. Rated for full legal power. Overall height, 44". Assembled.
HDP-3850-1, Shpg. wt. 3 lbs. **29.95**

80-Meter Trap (not shown). Same as above, except covers 3500-3775 kHz. Rated at full power.
HDP-3850-2, Shpg. wt. 2 lbs. **29.95**

[4] Cushcraft ATB-34 Tri-Band Beam Antenna. Equals single-band yagi on 10, 15 and 20 meters. Broad bandwidth, four active elements for super performance. With low-loss 1:1 balun which mates with PL-259 connector. Turning radius, 18'9". Wind area, 5.4 sq. ft. Mfr.'s sugg. price $289.00. UPS shippable.
HDP-1471, Shpg. wt. 46 lbs. **239.95**

[5] Cushcraft A147-11 11-Element Yagi Antenna. 13.2 dB forward gain, a 28 dB front-to-back ratio and gamma match tuning for minimum SWR. Feeds directly with 52-ohm coax. 146-148 mHz. Assembly required. Mfr.'s sugg. price $36.95.
HDP-1470, Shpg. wt. 6 lbs. **29.95**

[6] Barker and Williamson 5-Band Trap Dipole Antenna. Covers 80 through 10 meters. Only 2 trap adjustments and terminations. Ready to use. Includes wire, traps, 50-ft. RG-8/U coax and PL-259 connector, two end insulators and dipole center connector. 52Ω. Traps 9 oz. each. Length 110 feet.
HDP-3500, Shpg. wt. 9 lbs. **64.95**
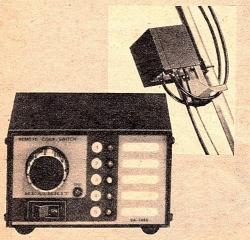
[7] Don't waste your signal! World-famous "W2AU" balun helps reduce TVI and improve F/B ratio. 2 kW PEP rating, 3-30 mHz. Fully enclosed body with silver-plated SO-239 connector and hang-up hook, built-in lightning arrester. Weatherproof. Includes complete instructions. Impedance ratio, 1:1.
HDP-3615, Shpg. wt. 1 lb. **14.95**

[8] Choose among up to four antennas or interconnect gear with this Coax Switch. Handles 2 kW PEP, to 250 mHz. 50 ohms. Grounds all outputs not in use.
Kit HD-1234, Shpg. wt. 1 lb. **9.95**
HDP-3622, 3 ft. coax with conn., 1 lb. **4.95**

[9] Alliance HD73 Heavy-Duty, Dual-Speed Rotator. For antennas with up to 10.7 sq. ft. wind load area. Has positive no-slip drive, automatic brake action. For masts 1⅜" to 2½" O.D. For 120 VAC, 60 Hz. Uses 6-cond. cable, or 8-cond. listed below.
HDP-1295, Shpg. wt. 19 lbs. **119.95**
IDA-1290-1, 50-ft. 8-cond. cable, 2 lbs. **7.95**
IDA-1290-2, 100-ft. 8-cond. cable, 4 lbs. **13.95**
IDA-1290-3, 150-ft. 8-cond. cable, 6 lbs. **18.95**

[10] Solve TVI problems with this rugged low-pass Barker and Williamson filter. Provides a minimum of 70 dB attenuation. Cutoff frequency is 34 mHz. Less than 0.3 dB insertion loss at operating frequency. For 10-160 meters. 50Ω. Full legal power.
HDP-3700, Shpg. wt. 2 lbs. **29.95**
HDP-3622, 3-ft. coax with conn., 1 lb. **4.95**

Superflex RG-8/U 52-Ohm Coaxial Cables with PL-259 connectors (not shown). Lets your rig and antenna perform at top efficiency. 11-gauge center foam polyethylene dielectric, 92% braided shielded flexlife jacket. With PL-259 connectors.
HDP-3620, 100-ft., Shpg. wt. 11 lbs. **24.95**
HDP-3621, 50-ft., Shpg. wt. 6 lbs. **14.95**
HDP-3622, 3-ft., Shpg. wt. 1 lb. **4.95**

Give your antenna system more efficiency and convenience

Coax is expensive. So the bargain-priced SA-1480 Remote Coax Switch replaces five feedlines from shack to antennas with just one piece of coax. With the SA-1480, you can select any one of up to five remote antennas just by turning a knob. Never again will you need dedicated cables from your shack to each antenna.

Bright LEDs show you which antenna is being used. And with the SA-1480's erasable front panel, you can write each antenna's designation next to its LED indicator.

This Heathkit remote coax switch is capable of accepting even VHF signals, up to 150 mHz — and is designed to accept full legal power, up to 2000 watts PEP. Input impedances can vary between 50 and 70 ohms, with almost no insertion loss — less than 2 dB at 100 mHz. SO-239 connectors are used to connect coax to the SA-1480.

Silver-plated switch contacts reduce the standing wave ratio (SWR) for more efficient power transfer and greater reliability, while the SA-1480's special shielded, weatherproof switch housing protects the remote coax switch from the elements and further reduces SWR. As a result, SWR is reduced to 1.05:1 under 30 mHz, and 1.20:1 below 150 mHz.

The SA-1480 Remote Coax Switch also features a unique switch position that allows the grounding of all antennas simultaneously, to protect your antenna system from lightning strikes.

You'll find the SA-1480 easy-to-build. And when you're finished, a U-bolt assembly is included to make antenna pole mounting easier. Control box is 3⅜" H, 5³⁄₁₆" W, 5¼" D. Remote unit: 8¼" H x 4⅝" W x 7½" D. Order eight-wire cable below.
Kit SA-1480, Shpg. wt. 8 lbs. **84.95**
IDA-1290-1, 50-ft. 8-cond. cable, 2 lbs. **7.95**
IDA-1290-2, 100-ft. 8-cond. cable, 4 lbs. **13.95**
IDA-1290-3, 150-ft. 8-cond. cable, 6 lbs. **18.95**

Tuner and power supplies designed for your home QTH
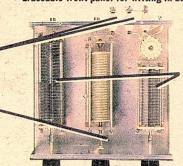
This new Heathkit 2 kW Antenna Tuner accepts all feed lines

$139.95

- Built-in balun accepts balanced or unbalanced feed
- Continuously variable inductor for exact matching
- Eraseable front panel for writing in band settings

Large ceramic insulators are designed to handle 2000 W PEP

Continuous tuning means a perfect match every time

Capacitors are easy to build and service

Here's the Antenna Tuner you've been asking for — and the more than 200 Hams at Heath have designed it with features and price that are hard to beat!

You're going to like the way the new Heathkit SA-2040 2 kW Antenna Tuner helps you radiate more of your signal by maximizing power transfer from your transmitter to your antenna. Your neighbors will like it, too, because it will help you reduce TVI and out of band emissions. The built-in balun gives you the versatility of using any type of feedline — balanced or unbalanced. And you can tune continuously from 3.5 MHz to 30 MHz, which means your SA-2040 is ready for MARS operation or for future band allocations.

This handsome addition to your shack features a continuously variable inductor to give you an infinite number of impedance settings, assuring precise antenna matching. A convenient counter on the front panel indicates inductors settings. And the eraseable front panel allows you to make notations of band settings for ease of operation, especially helpful in contest conditions.

The SA-2040 features silver-plated straps and roller contact assembly for minimal RF loss at high frequencies. Its large ceramic feed-through insulators are designed to withstand high voltage RF. This Antenna Tuner is capable of han-

dling power input of up to 2000 watts PEP on side-band and 1000 watts on CW. SO-239 connectors allow incorporation into your 50 Ω system.

It won't take you long to get your SA-2040 on the air — the easy-to-build kit is a two-evening project. And when you've tightened the cover, you can personalize your Heathkit Antenna Tuner, because stick-on numerals and letters in the kit let you add your own call sign to the front panel. The rugged black metal cabinet measures 5⅝" H x 14¹³⁄₁₆" W x 13¹⁵⁄₁₆" D.

Compare our new SA-2040 2 kW Antenna Tuner with all the competitors — match power handling capabilities, features and price. Then you'll see why the SA-2040 is your best buy for the money. This new Tuner is going to look great in your shack...and do a great job for you, too!

Kit SA-2040, Shpg. wt. 15 lbs. 139.95
HDP-3622, 3-ft. RG8U jumper with PL259 connectors, Shpg. wt. 1 lb. 4.95

SA-2040 SPECIFICATIONS: Frequency Coverage: 3.5-30 MHz. Power Input Capability: SSB: 2000 watts PEP; CW: 1000 watts. Input Impedance: 50 ohm. Output Impedance: Wide Range. Cabinet Dimensions: 5⅝" H x 14¹³⁄₁₆" W x 13¹⁵⁄₁₆" D.

AC Power Supplies for your Heathkit or other make Amateur Radio gear

[1] The PS-1175 supplies the necessary voltage and current to power the HW-2036A transceiver and HA-202A 2-meter amplifier from standard 120 VAC or 240 VAC outlets for base station operation. Has 120/240 VAC wiring options, fused overload protection. With cables and 3-wire line cord.

Kit PS-1175, Shpg. wt. 15 lbs. 59.95
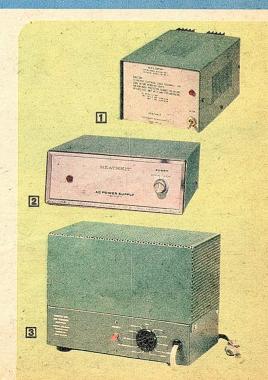
PS-1175 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (internally adjustable from approx. 12 to 14.5 VDC). Output Current: 10 amperes intermittent, 10 minutes max. (5 amperes continuous). Load Regulation: less than 1% at 10 amperes. Ripples less than 0.5% at 10 amperes. Power Requirement: 120 VAC, 50/60 Hz at 4 amperes, 240 VAC, 50/60 Hz at 2 amperes. Fuses 4-ampere, 3AG, slow-blow for 120 VAC primary, 2-ampere, 3AG, slow-blow for 240 VAC primary. 15-ampere, 3AG, output. Dimensions: 5¹¹⁄₁₆" H x 6³⁄₁₆" W x 11" D.

[2] Last call on the HWA-2036-3. Supplies the necessary voltage and current to power your HW-2036A 2-M transceiver from a standard AC outlet for base station operation. 120/240 VAC wiring options, fused overload protection. With all cables for easy hookup and 3-wire line cord. Matches the handsome styling of the Heathkit HW-2036A. Easy printed circuit board kit assembly.

Kit HWA-2036-3, Shpg. wt. 7 lbs. 29.95

HWA-2036-3 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (Adjustable internally from approx. 10 to 15 VDC). **Output Current:** 2.7 amperes, intermittent, 20 minutes max. (1.8 amps continuous). **Regulation:** Better than 1% from no load to full load (2.7 amperes). **Ripple:** less than 0.1%. **Power Requirement:** 110 to 130 VAC or 220 to 260 VAC, 50/60 Hz at 75 watts (full load). **Dimensions:** 3" H x 7¼" W x 10" D.

[3] The PS-23 provides the operating voltages for the HW-101 as well as those necessary for the operation of many older Heath transceivers. Has high voltage and two internally selectable low B+ taps. Also provides fixed bias and 12.6 filament voltage. The PS-23 features excellent bias supply filtering and extremely low ripple content. Can be used with many other transceivers, too.

Kit PS-23, Shpg. wt. 17 lbs. 59.95

PS-23 SPECIFICATIONS: High voltage output: 820 VDC no load; 700 VDC @ 250 mA ±10%. AC ripple. Less than 1% @ 250 mA. **Low voltage output:** (High tap) 350 VDC, no load; 300 VDC @ 150 mA ±10%, (Low tap) 275 VDC, no load; 250 VDC @ 100 mA; ±10%. Less than 0.05% AC ripple @ 150 mA, continuous duty to 175 mA. **Fixed bias:** −130 VDC ±10%, no load; −100 VDC @ 20 mA. **Power requirement:** 120/240 VAC, 60/50 Hz, 350 watts maximum. **Dimensions:** 6¾" H x 4¾" W x 9" L.

Heathkit linears fight inflation with more punch per dollar

SB-221 SPECIFICATIONS
Band coverage: 80, 40, 20 & 15 meters. **Max. power input:** SSB, 2000 W. PEP; CW, 1000 W; RTTY, 1000 W. **Driving power:** 100 W. **Duty cycle:** SSB, Continuous voice modulation. CW, Continuous (max. key-down 10 min.). RTTY, 50% (max. transmit time 10 min.). **Third order distortion:** −30 dB or better. **Input impedance:** 52 Ω unbal. **Output impedance:** 50 Ω unbal.; SWR 2:1 or less. **Front panel controls:** Tune, Load, Band, Sensitivity Meter Switch, Power, CW/Tune — SSB, Plate meter, Multi-meter (Grid mA, Rel. Power, High Voltage) **Rear panel:** Line cord, circuit breakers (two 10 A). Antenna Relay (phono). ALC (phono). RF Input (SO-239). Ground post. RF Output (SO-239). **Tubes:** Two Eimac 3-500Z. **Power req.:** 120 VAC, 50/60 Hz @ 20 amp. max. 240 VAC, 50/60 Hz @ 10 amp. max. **Cabinet size:** 8¼″ H x 14⅞″ W x 14½″ D.

Get a 20 over 9 signal with the Heathkit SB-221 2 kW Linear

$569⁹⁵

- Paralleled Eimac 3-500z's deliver top power
- 2 kW PEP on phone, 1 kW in on CW and RTTY
- Heavy duty power supply for reliable operation
- Easily wired for either 120 or 240 VAC

Haven't you lost enough contacts because you can't punch your signal through? The Heathkit SB-221 Linear Amplifier packs a wallop that will get you 20 over 9 reports when the others are down in the noise. And the SB-221 does it at a price that's hard to beat. Now that you're ready to move up to 2 kW power, see why this amp is the one for your shack.

A pair of rugged Eimac 3-500Z's deliver 2000 watts PEP in on phone, and can be loaded to 1 kW in on both CW and RTTY. A broad-band pre-tuned pi-input delivers maximum efficiency with extremely low distortion over the entire 80-15 meter bands. Just 100 watts of exciter drive is all that's required to drive this amplifier to full output. No alignment necessary.

With an SB-221, tune-up couldn't be easier! Just select the band you wish to operate, set the CW-tune/SSB rocker switch to the CW-tune position, adjust both tune and load controls for maximum relative power out — and you're ready to go. Ready with the kind of signal that always catches the new DX, gets your traffic through, and provides reliable year-after-year communications performance.

The SB-221's power supply can be easily wired for either 120 or 240 VAC operation. Zener diode-regulated operating bias reduces idling current for cooler running and extended tube life. The amplifier incorporates built-in circuit breaker protection and a large, quiet-running fan provides maximum tube cooling. Other features include ALC to prevent distortion-producing overdrive; front-panel switch-selected monitoring of grid current, relative power, and high voltage. There's also a separate meter for measuring final amplifier plate current.

A great amp with a great price . . . just what you'd expect from a Heathkit Linear!

Kit SB-221, Shpg. wt. 66 lbs. 569.95
HDP-3622, 3-ft. RG8/U Jumper w/PL259 Connectors, Shpg. wt. 1 lb. 4.95

SB-201 SPECIFICATIONS:
Band coverage: 80, 40, 20 & 15 meters. **Maximum power input:** 1200 watts P.E.P. SSB, 1000 watts CW. **Driving power required:** 100 watts. **Duty cycle:** SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). **Third order distortion:** −30 dB or better at 1000 watts P.E.P. **Output impedance:** 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. **Input impedance:** 52 ohm unbalanced; broad-band pretuned input circuit requires no tuning. **Meter functions:** 0-100 ma grid current, 0-1000 ma plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. **Front panel controls:** Load; Tune; Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch. **Tube complement:** Two 572B/T-160-L (in parallel). **Power requirement:** 120 volts AC @ 16 amperes (maximum), 240 volts AC @ 8 amperes (maximum). **Cabinet dimensions:** 6⅝″ H x 14⅞″ W x 13⅜″ D.

Don't be fooled by those sweep-tube linear amplifiers

$389⁹⁵

- Rugged 572B finals need just 100-watt exciter
- Forced air cooling is ideal for contesting
- Switchable multifunctional metering
- Pre-aligned cathode-input tank circuits

Do you find yourself sitting on the sidelines during a pileup for a rare DX find because your signal doesn't measure up to the challenge? Then move up to the Heathkit SB-201 1 kW Linear Amplifier. It won't put a hole in your ham-gear budget while it's punching a hole through the QRM.

Just 100 watts is all it takes to drive the 201's heavy-duty pair of forced air-cooled 572B's to a full 1200 watts PEP in on phone, and 1000 watts in on CW. So it's ideal for use with most popular transmitters or transceivers. And you have no fear of TVI, because those finals are completely shielded to insure excellent TVI protection.

The SB-201 sports an ALC output to prevent distortion-producing overdrive. And for maximum efficiency, the 201's cathode-input tank circuits come pre-aligned and ready to go on air. No alignment necessary.

The SB-201 has a built-in solid-state power supply which features full circuit breaker protection. A switchable multi-function panel meter shows SWR, grid current, plate current, relative power and plate voltage. For extra operating convenience, an antenna relay automatically switches the antenna to the exciter input when the SB-201 is off.

The sturdy yet lightweight construction of the SB-201 is achieved by using a heavy-gauge one-piece aluminum chassis that is partitioned for extra strength and component isolation. The amplifier's clean open chassis layout assures easy assembly and provides maximum efficiency for year-after-year dependability.

From its front panel right on back to the rear apron, the SB-201 is packed with features that make this amplifier a bargain.

Kit SB-201, Shpg. wt. 47 lbs. 389.95
HDP-3622, 3-ft. RG8/U Jumper w/PL259 Connectors, Shpg. wt. 1 lb. 4.95

Low cost, high performance gear to help you get on the air

HX-1681 QSK CW Transmitter has the power to span the globe

$239⁹⁵

- 100 W out on 80-15, 75 W out on 10
- Built-in VFO
- Rugged 6146 finals
- Full-break-in (QSK)
- Designed to match the HR-1680
- Solid-state T/R switching

The HX-1681 QSK Transmitter is a top notch CW rig for Novice or CW veteran. You get full break-in and built-in solid-state TR switching, sidetone output with adjustable tone and level, and receiver muting. A pair of rugged 6146As give you 100 W minimum on 80 thru 15 M and 75 out on 10. Covers 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-28.5 MHz. Requires Heathkit PS-23 power supply on page 80. Dimensions: 6¾" H x 12¾" W x 12" D. The HX-1681 Transmitter is a perfect mate for the HR-1680 Receiver (at right).

Kit HX-1681, Shpg. wt. 16 lbs. 239.95
Kit PS-23, AC Power Supply, Shpg. wt. 17 lbs. 59.95

HR-1680 SSB/CW Receiver — ideal for serious Ham band listening

$209⁹⁵

- Dual conversion front end works 80 through 10 M
- Built-in preselector
- 0.5 μV sensitivity
- 4-Pole crystal filtering
- Active audio filtering
- No instrument alignment
- Built-in 100 kHz calibrator

Low cost and high performance make the solid-state HR-1680 the right choice for your first receiver. A hot dual-conversion front end and 0.5 μV sensitivity covers 80 thru 10 meters: 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-28.5, 28.5-29.0 MHz. 4-Pole crystal filter for razor sharp selectivity. Tunable preselector filters out unwanted signals. Built-in 100 kHz calibrator. Match the 1680 with the HX-1681 for an unbeatable pair. Can be aligned without instruments. 120/240 VAC or 11.5-5-15 VDC. 6¾" H x 12¾" W x 12" D.

Kit HR-1680, Shpg. wt. 14 lbs. 209.95
Kit HS-1661, Matching Speaker, 5 lbs. 24.95

For Novice or Extra, at home or in the great outdoors, the HW-8 is your passport to the ultimate challenge of QRP operation

$129⁹⁵

- 80, 40, 20 and 15 meters CW
- 0.2 μV receiver sensitivity
- Adjustable T/R delay and semi break-in
- Tunable preselector
- Two-position active audio filter
- Front panel meter to show relative power

Put the fun back in a great hobby. Try QRP operation with the Heathkit HW-8. With your skill and this great little CW transceiver to back you up, you'll be amazed at what you can do. Power your HW-8 from a trail bike's battery to pump that QRP signal into the great outdoors through a dipole strung between two pines. Or join the growing number of Hams going to solar-powered QRP operation. You can do it with this great little performer.

Performance starts with a quiet, super-sensitive receiver section. Hum and noise figures are minimal and as little as 0.2 μV in at the antenna terminal gives you a usable signal. There's a tunable preselector, selectable wide and narrow audio filtering, RF and AF gain controls.

The HW-8 pumps a minimum of 3 watts in on 80 and 40, 2.5 watts in on 20 and 15. Semi-break-in operation with adjustable T/R delay, a built-in relative power meter, pushbutton bandswitching, and stable temperature-compensated VFO. Runs on batteries (not supplied) or from optional AC power supply.

A great performer that's going to give you hours of fun in the shack or on a mountain peak — that's the HW-8. Order yours now so you can join the growing numbers who are discovering the fun and fraternity of QRP operation with the popular HW-8.

Kit HW-8, Shpg. wt. 6 lbs. 129.95
Kit HWA-7-1, AC Power Supply, Shpg. wt. 4 lbs. 17.95

HW-8 SPECIFICATIONS: Transmitter — DC Power Input: 3.5 W (80 M); 3.0 W (40 M); 3.0 W (20 M); 2.5 W (15 M). Frequency Control: built-in VFO. Frequency Stability: Less than 150 Hz/hour drift after 60 minutes warm-up. Receiver: Sensitivity: 0.2 μV for readable signal; 1 μV or less for 10 dB S+N/N. Frequency Coverage: 3.5-3.75; 7.0-7.25; 14.0-14.25; 21.0-21.25 MHz. Power Requirement: 12-16 VDC, 90 mA, receive; 430 mA, transmit. Size: 9¼" H x 8½" W x 4¼" D.

$599.95 buys you the best transceiver value in town

SAVE $130.00 from Catalog 845

NOW $599.95

When things get tough, Heath gets tough. The SB-104A is a proven performer, and we're out to show you the kind of real performance/price values you get when you buy from Heath. Compare the features, specs and performance with any other transceiver. We know the answer you'll get! And, while you're at it, check our accessory prices too — External VFO, Station Console, Power Supply and Monitor Scope. Heath wins again.

And you'll be a winner, too, the moment you experience the excitement and convenience of SB-104A operation. Apply power and almost instantly six red digits are ready to display your operating frequency to within ±200 Hz accuracy. Pushbutton select CW upper, or lower sideband transmission, plug in your key, or opt for PTT or VOX operation and you're ready to experience broadband solid-state excitement.

Spin the main tuning knob and appreciate its feel as you smoothly move the 104A's temperature-compensated FET Hartley VFO up or down the band. And as you QSY, you'll quickly discover that the SB-104A's completely re-engineered front end receiver board really means business! Its circuitry is factory preassembled and tested, incorporates individual preselector filters for each band, features balanced first and second mixers, and plays a large part in the 104A's less than 0.5 microvolt sensitivity figure.

The SB-104A's receiver features razor sharp filtering, excellent IF selectivity, individual crystal-controlled BFOs for USB, LSB and CW, and balanced mixer product detection. Received audio quality is outstanding, precisely tailored for SSB and CW re-

96

production. And to make your QSOs more enjoyable, by reducing the nuisance of QSB, you can switch select either fast or slow AGC action.

When it comes to innovation, the SB-104A's transmitter section is second to none. You have a choice of 100 watts out for "barefoot" operation or, with the touch of a button, select one watt out and turn your 104A into Ham radio's most sophisticated QRP rig. Transmitter circuitry features quad op-amp audio processing on both phone-patch and microphone inputs, filter sideband generation, crystal-controlled heterodyne oscillators for maximum frequency stability, and a unique ALC system to eliminate distortion-producing overdrive. Most importantly, the SB-104A utilizes driver and PAs in a broadband no tune push-pull configuration.

For extra operating performance, add the optional SBA-104-3 400 Hz CW crystal filter or cut ignition noise by installing the SBA-104-1 noise blanker. Operates from a charging 12 VDC auto electrical system or the PS-1144 Power Supply.
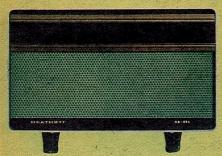
Kit SB-104A, Shpg. wt. 32 lbs. . . . . Was $729.95, Now 599.95
Noise Blanker for SB-104A.
Kit SBA-104-1, Shpg. wt. 1 lb. 29.95
400 Hz CW Crystal Filter for SB-104A.
Kit SBA-104-3, Shpg. wt. 1 lb. 42.95

Look At These Super SB-104A Specifications!

Frequency Coverage: 3.5 MHz through 29.7 MHz amateur bands, 15 MHz WWV receive only. **Frequency Stability:** Less than 100 Hz/30 min drift after 30-min. warmup; less than 100 Hz drift for ±10% change in primary voltage. **Readout Accuracy:** Within ±200 Hz ±1 count. **TRANSMITTER — RF Power Output:** High Power (50-ohm non-reactive load). SSB: 100 watts PEP ±1 dB; CW: 100 watts ±1 dB. Low Power SSB: 1 watt PEP (minimum); CW: 1 watt (min.). **Output Impedance:** 50 ohms, less than 2:1 SWR. **Carrier Suppression and Unwanted Sideband Suppression:** —50 dB down from 100 watt single-tone output at 1000 Hz reference. **RECEIVER — Sensitivity:** 0.5 for 10 dB S+N/N for SSB. **Selectivity:** 2.1 kHz minimum at —6 dB, 5 kHz max. at —60 dB. (2:1 nominal shape factor). **CW Selectivity:** (with accessory CW filter) Selectable 2.1 kHz/400 Hz. **IM Distortion:** —65 dB min.; —57 dB typ. with noise blanker. **Image Rejection:** —60 dB min. **Dimensions:** 5¾″ H x 14¹³⁄₃₂″ W x 13⅞″ D.

Station accessories for your SB-104A

Remote VFO, Power Supply, Monitor and Console

[1] Matching Speaker for the SB-104A

[2] Remote VFO designed for the SB-104A

[3] Matching Station Monitor

[4] Five-function Station Console

[1] **Matching Speaker for SB-104A.** Cabinet is large enough to house the PS-1144 Power Supply too. SSB response-tailored. 5" x 7" oval speaker. 300-3000 Hz response. Connector plug and cable included. 7⅛" H x 10⅛" W x 14" D.
Kit SB-604, Shpg. wt. 8 lbs. **39.95**

Fixed station Power Supply for the SB-104A. 120/240 VAC supply provides 13.8 VDC required by SB-104A. Full-wave bridge circuit with triple Darlington regulation has IC to sample at the transceiver, compare and automatically maintain fixed voltage. Mounts inside SB-604 Speaker cabinet.
Kit PS-1144, Wt. 27 lbs. **89.95**

[2] **For real versatility Remote VFO** provides split transmit/receive so necessary for DX or net operation. Allows transceiver operation with either the "644A" or the SB-104A. Use either of two crystal positions for fixed-frequency control. Use 644A tuning scale for reference; SB-104A displays exact frequency readout.
Kit SB-644A, Wt. 10 lbs. **99.95**

SB-644A SPECIFICATIONS: Frequency Coverage: 5.0-5.5 MHz allowing 80-10 M operation in the SB-104A. **Frequency Stability:** less than 100 Hz drift per 30 min. after 30 min. warmup. **Modes of Op:** Remote VFO Main VFO; Receive Remote/Transmit Main; Receive Main/Transmit Remote; Crystal frequencies (2) (crystals not supplied). **Power Requirement:** 11 V and 13.6 V at 500 mA supplied by SB-104A. **Size:** 7¼" H x 10¼" W x 15¼" D.

[3] **Station Monitor lets you see your signal.** Monitors SSB, CW & AM signals up to 1 kW from 80-6 M. Screen displays nonlinearity, insufficient or excessive drive, poor carrier or sideband suppression, regeneration parasitics, key clicks.
Kit SB-614, Wt. 17 lbs. **159.95**
HDP-3622, 3 ft. coax w/conn. Wt. 1 lb. **4.95**

SB-614 SPECIFICATIONS: RF SAMPLING SECTION: Power Limits: Exciter Input (50-75 Ω) 10-300 W; Antenna Input (50-75 Ω) 10-1000 W. **Insertion Loss:** Negligible. **VERT. AMPLIFIER: Input Impedance:** 1 MΩ shunted by 75 pf. **Sensitivity:** 60 mV rms/¼" vert. deflection. **Attenuator:** 2-pos.; x1, 2V rms max. input; x10, 20V rms max. input. **HOR. AMPLIFIER: Input Impedance:** 1 MΩ shunted by 50 pf. **Sensitivity:** 50 mV rms/¼" hor. deflec. **Power:** 120/240 VAC, 60/50 Hz. **Size:** 7¼" H x 10¼" W x 15¼" D.

[4] **Five-function Station Console.** Features 24-hr. digital clock; 10-min. ID timer; 200/2000 W full scale RF wattmeter; SWR bridge with sensitivity control; manual/VOX phone patch providing at least 30 dB isolation. Input impedance 600 Ω.
Kit SB-634, Wt. 13 lbs. **179.95**
HDP-3622, 3 ft. coax w/conn. Wt. 1 lb. **4.95**

SB-634 SPECIFICATIONS: CLOCK – Display: Six digits. **Time Base:** 24 hr. **TIMER – Display:** Three full digits. **Time Interval:** 10 min. with auto. reset. Manual reset at any portion of 10-min. period. **Signal:** Visual and aural or visual only. **RF POWER/SWR METER – Frequency Range:** 1.8 to 30 MHz. **Wattmeter Accuracy:** ±10% of full-scale reading. **Power Handling Capability:** 2000 W (max.). **SWR Sensitivity:** Less than 10 W. **Impedance:** 50 Ω nominal. **Connectors:** SO-239. **Power Requirement:** 120/240 VAC, 60/50 Hz. **Size:** 7¼" H x 10¼" W x 15¼" D.

Useful Reference Books to help you gain more from the world of electronics

Heathkit Learning Dictionary compiles the language of electronics. Includes a compendium of 16 topic outlines. Want to learn about filters, for example? Topic outline lists related terms so your Dictionary becomes an effective learning tool. 832 pages. **EB-1010** **14.95**

Transistor Substitution Handbook. Replacements for over 19,000 American and foreign bipolar transistors. Includes computer-selected and manufacturers-recommended replacements. 544 pages.
EDP-175 . . . . **5.95**

The 555 Timer Applications Source Book. Explains the 555 timer and 556 dual timer. Includes 17 simple experiments to give you a basic practical knowledge in using the 555 timer. 160 pages.
EDP-249 . . . . **6.95**

The TTL Data Book. Design and specification data, pin outs, test data and applications of transistor-transistor logic. Indexes are designed for ease of circuit selection. Section on IC sockets and interconnection panels is handy reference for the design engineer. 832 pages. **EDP-220** **7.50**

Electrical Soldering. Excellent book for beginners and good review for technicians. Functions and requirements of soldering equipment for manufacturers. 144 pages. **EDP-178** **3.95**

Tube Substitution Handbook. Lists 12,000 replacements for all types of American and foreign receiving and picture tubes. Tube basing diagrams provide handy reference to pin numbers. 112 pages. **EDP-174** **2.95**

TTL Cookbook. What transistor-transistor logic is, how it works, how to use it. From basic to advanced designs, gate and timer circuits, JK and D-type flip-flops, etc. Includes projects. 336 pages. **EDP-183** **8.95**

Home TV-FM Antennas. For technician or homeowner with basic electronic knowledge. Antennas, towers, lead-in, rotators, amps, accessories. Photos show installation from start to finish. 208 pages. **EDP-186** **6.50**

Building and Installing Electronic Intrusion Alarms. For novice installing own system or technician entering security electronics. 128 pages.
EDP-135 . . . . **4.50**

Heathkit HW-101–the best buy in Ham Radio today –over 27,000 sold throughout the world

$389⁹⁵

- Full 80 through 10 meter Amateur band coverage
- USB, LSB, CW, PTT and VOX operation on all bands
- 0.35 μV receiver sensitivity digs out weak signals
- 180 watts PEP input, 170 watts CW

The Heathkit HW-101 is the economical, value packed way to put yourself on the bands. And with the kind of performance this rig has to offer, you'll find it hard to believe you're operating on a budget. Full coverage of all the bands, 80 through 10, lets you enjoy the total spectrum of ham radio operation. Operate PTT or VOX on upper or lower sideband or select CW transceive — they're all there, the options you'd expect to find on a transceiver that's always top notch.

You get outstanding receiver performance. The HW-101's 0.35 μV sensitivity on SSB brings in weak stations loud and clear. The high quality crystal IF filter keeps signals separate. Image and IF rejection of better than 50 dB help bring you world-wide receiving that's clean, clear and crisp. And when you add the optional 400 Hz CW filter to your 101, your copy will be arm chair all the way.

There are a lot more features. A fast acting AGC circuit prevents fading and blasting. There's front panel metering to show you signal strength, plate current, and relative power out. And to make sure you're always right on frequency and inside the band, the HW-101's built in 100 kHz calibrator is ready for reference at the flick of a switch.

The HW-101's transmitter section is a top performer too. Triple action level control prevents distortion producing overdrive to keep your signal clean. And power? With a rugged pair of reliable 6146s for finals, the HW-101 punches 180 watts PEP in on phone and 170 watts in on CW. Frequency stability is better than 100 Hz per hour after 45 minutes warmup, with less than 100 Hz variation for a 10% line voltage variation. An FET VFO provides excellent thermal stability for heavy-duty operating without excessive heat buildup. When you're ready to go the legal limit, by adding Heath's SB-201 or 221 to your shack, the HW-101 will make the perfect exciter. And don't forget to check out the new HDP-1220 Clipper (at right) for your HW-101. This true RF speech processor increases average SSB output 66% to really punch your signal through.

Easy to assemble circuit boards and color coded wiring harnesses speed assembly. And when it comes time for alignment, you'll really appreciate the wide-open layout of the HW-101's rugged chassis design. Look over the features and compare price with performance; it's easy to see the Heathkit HW-101 is ham radio's best buy. Requires Heathkit Model PS-23 power supply.

Kit HW-101, Shpg. wt. 22 lbs. 389.95
SBA-301-2, 400 Hz CW crystal filter, Shpg. wt. 1 lb. 39.95
Fixed Station AC Power Supply. See page 93 for details.
Kit PS-23, 17 lbs. 59.95
Kit HS-1661, Matching Speaker, 5 lbs. 24.95

HW-101 SPECIFICATIONS: RECEIVER: Sensitivity: <0.35 μV for 10 dB S+N/N for SSB operation. SSB selectivity: (optional SBA-301-2 CW filter); 400 Hz min. @ 6 dB down; 2.0 kHz max. @ 60 dB down. Spurious response: Image and IF rejection >50 dB. TRANSMITTER: DC power input: SSB 180 W PEP (normal voice, cont. duty cycle). CW 170 W (50% duty cycle). RF power output: 100 W on 80 thru 15 M; 80 W on 10 M (50 non-reactive load). Output impedance: 50 to 75 with <2:1 SWR. Harmonic radiation: 40 dB below rated output. Mike input: High impedance. Carrier suppression: 45 dB down from single-tone output. Unwanted sideband suppression: 45 dB. Third order distortion: 30 dB from two-tone output. GENERAL: Frequency coverage: 80-10 M amateur bands. Frequency stability: <100 Hz per hour drift after 45 minutes warmup from normal ambient conditions. <100 Hz for ±10% line voltage variations. Modes of op: USB, LSB, CW, tune. Dial calibration: 5 kHz. Calibration: 100 kHz crystal. Power requirements: 700 to 850 V at 250 mA with 1% maximum ripple; 300 V at 150 mA with 0.05% maximum ripple; −115 V at 10 mA with 0.5% maximum ripple; 12 V AC/DC at 5.76 amps. (see power supplies on pg. 93). Size: 6⁵⁄₁₆" H x 14³⁄₁₆" W x 13³⁄₈" D.

$189⁹⁵ buys it all in a 2M hand-held

- **VF-2031 2-meter Transceiver**
- **Drop-in Battery Charger**
- **Rechargeable Battery Pack**
- **"Rubber duckie" Antenna**
- **Built-in phone jack and earphone**
- **8 Channel capability, duplex or simplex**

Everything you need to begin operating, including 146.94 MHz crystal

Carry 2-meter action with you wherever you go with the great Heathkit VF-2031. You get a minimum of 2 watts out, more than enough to put you into your local repeater full quieting everytime. The signal is clean, too. Careful design and plenty of internal shielding insures stability and puts spurs a full 60 dB down. With the Heathkit VF-2031, you'll never need to worry about accidentally accessing the wrong repeater or interfering with other services.

Single crystal transmit and receive circuitry covers 8 of your favorite channels. You can choose simplex or duplex with a ±600 kHz split at the flip of a switch.

With separate built-in microphone and speaker, adjustable deviation, and performance-designed FM engineering, what your 2031 says and hears is always crisp and clean. Sensitivity? Less than 0.5 μV quiets the 2031's hot receiver section a full 20 dB. Volume and squelch are fully adjustable, too, so you can tailor your operation to match almost any listening condition. The VF-2031 covers 143.5 to 148.5 MHz.

There's more: The VF-2031 comes complete with a "rubber duckie" antenna and a crystal for 146.94 operation. There's a built-in phone jack with earphone included. A universal BNC output connector to give you a wide choice in antenna selection. And to give your 2031 even more flexibility, add the optional VFA-2031-3 encoder and enjoy the versatility of instant auto-patch accessing. Includes a long-life rechargeable nickel-cadmium battery pack to keep you on the air for up to 10 full hours. When the charge runs low, slip the 2031 into the drop-in charger, also included in the purchase price. The VF-2031 can be recharged usually in 14-24 hours.

Check the features. Compare. You'll find the VF-2031 one of the most versatile hand-helds around and one of the best bargains in Amateur Radio.

Kit VF-2031, Shpg. wt. 5 lbs. **189.95**

Fitted Holster-style Carrying Case. See photo at right. Just put the VF-2031 on your belt. The top-mounted controls remain easily accessible.
VFA-2031-2, Shpg. wt. 1 lb. **17.95**

Crystal Certificates. Specify frequency and send to manufacturer. Receive crystal postpaid by return mail. Order one certificate for each crystal you need.
VFA-2031-4, Postpaid **6.95**

Auto-Patch Encoder. Access telephone lines through repeaters with auto-patch inputs to make telephone calls with your VF-2031.
VFA-2031-3, Shpg. wt. 1 lb. **34.95**

Continuous Tone Encoder. Allows you to access most repeaters using your hand-held transceiver. Builds right into VF-2031.
VFA-2031-5, Shpg. wt. 1 lb. **34.95**

External Microphone. PTT MIC with coiled cord plugs into VF-2031 so you can transmit without removing unit from holster. Coiled Mic cord attaches to a handy clip on the case so when you're not operating, both your hands are free.
Kit VFA-2031-6, Shpg. wt. 1 lb. **29.95**
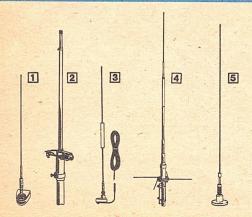
2-Meter Amplifier. Ideal for use with the VF-2031. Delivers up to 10 watts for 1½ watt input. See page 100 for description.
Kit HA-201A, Shpg. wt. 2 lbs. **34.95**

VF-2031 SPECIFICATIONS: Receiver — Sensitivity: 0.5 μV or less for 20 dB quieting; 0.35 μV for 12 dB SINAD. **Squelch Threshold:** 0.25 μV or less. **Audio Output:** 1 watt at less than 10% THD. **Operating Frequency Stability:** 0.005% or better. **Adjacent Channel Selectivity:** 40 dB or greater. **Image Rejection:** —45 dB or greater. **IF Frequency:** 10.7 MHz. **Usable Bandwidth:** 7 kHz. **TRANSMITTER: Power Output:** 2.0 watts or more at 12.5 VDC (nominal). **Deviation:** 5 kHz (adjustable). **Spurious Output:** —60 dB or greater referenced to carrier. **Stability:** 0.005% or better. **Oscillator Frequency:** approx. 15 MHz. **Multiplication Factor:** x9. **Type of Modulation:** Frequency. **Transmitter Offsets:** 0 (simplex), —600 kHz, +600 kHz with crystals supplied. **GENERAL: Frequency Coverage:** 143.5 to 148.5 MHz (unit will meet specs ±1 MHz from the alignment frequency within this range). **Antenna Impedance:** 50 ohms. **Size (Overall):** 9⅛" H x 3¾" W x 1⅞" D. **Transceiver Weight.** Including batteries: 2 lbs.

Shown with optional auto-patch encoder

Assembled 2-meter antennas to get your signal out from your shack or vehicle

[1] Hustler standard gain 2M mobile antenna. ⅝ wavelength rear deck whip. 3.4 dB gain. 1.1:1 SWR. Handles 100 watts. 47" radiator. 17' coax and connectors included. Antenna is removable from mount.
HWA-202-3, Shpg. wt. 2 lbs. **23.95**

[2] Cushcraft AR-2 Ringo standard gain fixed antenna. 135-175 MHz. Omnidirectional. 3.75 dB gain. 1.1:1 SWR. 100 watts. 52Ω feed with PL-259. Less coax. Mfr's suggested list price, $24.95.
HWA-202-11, Shpg. wt. 2 lbs. ......**Our price, 19.95**

[3] Hustler CGT-144 super gain 2M collinear mobile antenna. Phased ¼ and ⅝ wavelength radiators. 5.2 dB gain. 1.1:1 SWR; to 200 watts; Height 85".

17' RG-58/U coax and connectors included.
HWA-202-9, Shpg. wt. 3 lbs. **39.95**

[4] Hustler super gain fixed antenna. Covers 140-150 MHz. 6 dB gain. 6 MHz bandwidth. 1.2:1 SWR. 1 kW. SO-239 connector. 117" tall. 4 radials of 21" alum. rod. For 1¾" mast. Less coax.
HWA-202-10, Shpg. wt. 7 lbs. **69.95**

[5] Cushcraft 2-Meter Mobile Magnetic-Mount Antenna. ⅝ wave. 3 dB gain. Covers 145-148 MHz. Wind-tested in excess of 90 mph. Includes PL-259 connector, cable. Preassembled and ready to use. Provides excellent 2-M reception, transmission.
HDP-1472, Shpg. wt. 3 lbs. **29.95**

99

Cut $80.00 from Catalog 845

Shown with optional Micoder II installed

Last call—HW-2036A 2-meter transceiver

$199.95
with standard microphone

- Only limited quantities of this great transceiver left
- True digital frequency synthesis on the 2-meter band
- A minimum of ten watts out

If you're still rock-bound by a 2-meter rig that can't take another crystal pair, the HW-2036A is for you. Its phase locked synthesizer/VCO loop lets you operate on any 4 MHz segment of the 2036A's 143.5 to 148.5 MHz range... with just the flip of a switch. Choose simplex or standard ±600 kHz split operation. Or pick your own offset (1 MHz max.).

The synthesizer is locked to a precision 10 MHz time base for outstanding accuracy, has crystal-controlled offsets, IC divide chain, and a unique NAND gate logic system which displays locked/unlocked status and inhibits out of band transmissions.

The receiver features a double tuned front end with MOSFET RF amplification, dual-conversion, 8-pole crystal IF filtering for perfect bandpass shaping and outstanding adjacent channel selectivity, IC limiting, Quad detection, and excellent audio quality.

The transmitter gives you a minimum of ten watts out. Harmonic and spurious components are 60 dB down within 20 MHz of carrier reference. The HW-2036A also features sub-audible tone encoding, built-in 5 and 10 VDC regulators, hash filter/regulator to eliminate ignition noise and alternator whine. Includes gimbal-mount and PTT mike. For extra versatility, add the optional Heathkit Micoder II Microphone/Auto Patch Encoder (description on page 91) to your HW-2036A.

Kit HW-2036A-2, with PTT mike.
12 lbs. . . . Was $279.95 in Catalog 845, Now 199.95
Kit HWA-2036-3, Power Supply, See pg. 93.
7 lbs. .29.95
Kit HA-202A, 40 W Amp, 4 lbs. 49.95

4 MHz of synthesized performance

The HW-2036A 2-meter transceiver has the same exciting features and specifications as the industry-leading HW-2036... with one very important difference. Our 2036A offers a full 4 MHz of synthesized operation over any portion of its 143.5 to 148.5 MHz range. And because of this significant improvement, you'll be enjoying additional performance and flexibility without the time consuming necessity of VCO retuning.

Front panel lever switches select any frequency in any 4 MHz segment of the HW-2036A's operating range.
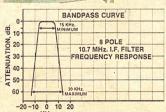
BANDPASS CURVE
8 POLE 10.7 MHz. I.F. FILTER FREQUENCY RESPONSE
15 kHz MINIMUM
30 kHz MAXIMUM

The HW-2036A's 8-pole IF crystal filter greatly reduces adjacent channel interference — an important feature as 2-meters grows in popularity and the band becomes more crowded — to give you clear, static-free FM transmission and reception.

HW-2036A SPECIFICATIONS: Receiver: Sensitivity: 0.5 μV for 12 dB SINAD (or 15 dB of quieting). **Squelch Threshold:** 0.3 μV or less. **Audio Output:** 1.5 W at 10% T.H.D. typically 2 W. (5 kHz deviation). **Image Rejection:** —45 dB or greater. **Spurious Rejection:** —50 dB or greater. **IF Rejection:** —80 dB or greater. **Internally Generated Spurious:** Below 1 μV equivalent. **Bandwidth:** 6 dB at 15 kHz min. and 60 dB at 30 kHz max. **Modulation Acceptance:** 7.5 kHz, min. **Transmitter: Power Output:** 10 W min. at 25°C and 13.8 VDC, into a 50Ω load. **Harmonic & Spurious Output:** —60 dB. **Modulation:** FM, 0 to 7.5 kHz, adjustable. **Duty cycle:** 100% with infinite VSWR. **Tone Encoder:** 3 tones, 70 to 200 Hz, approx. ±700 Hz deviation. **Frequency Increments:** 5 kHz. **Frequency Stability:** ±0.0015%. **Operating Temp. Range:** —10 to 50° C. **Operating Voltage Range:** 12.6 to 16 VDC (13.8 VDC nominal). **Current Consumption:** RX: 700 mA max. squelched. TX: 2.6 A max. at 13.8 V. **Size:** 2¾" H x 8¼" W x 9⅞" D.

2 M Mobile Amps

Meet FCC specifications for harmonic and spurious radiation

40 W 2M Amp for mobile transceivers

Delivers solid 40 W minimum for 10 watts in. Has antenna changeover relay and sensing circuitry for completely automatic T/R switching, tuned input/output circuits provide low spurious radiation. Special emitter ballasted configuration — withstands VSWR's of up to 3:1.
Kit HA-202A, 4 lbs. 49.95
HDP-3622, 3 ft. RG8U jumper with PL259
1 lb. 4.95

HA-202A SPECIFICATIONS: Power Output: 20 W @ 5 W in. 40 W @ 10 W in. 50 W @ 15 W in. **Impedance:** 50Ω nom. **Input VSWR:** 1.5:1 max. **Max. Stable VSWR:** 3:1. **Harmonic and Spurious Radiation:** —60 dB or better. **Standby Current:** 1 mA. **Power Requirement:** 12-16 VDC, 7 A max. **Size:** 3" H x 4¼" W x 5½" D.

HEATH CO.
MODEL HA-201A
BENTON HARBOR
MICHIGAN 49022

RF OUTPUT

10 W Amp for your 2-meter hand-held
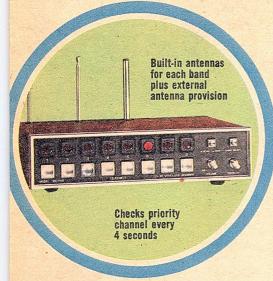
The HA-201A delivers up to 10 W for a 1½ W input, 8 W for a 1 W input — ideal for use with any low-power 2-meter transceiver. Fully automatic operation, solid-state transmit/receive switching, tuned input and output for maximum efficiency and reduced spurious emissions. Withstands infinite VSWR load. Includes dummy load, RF detector. Easy assembly. Comes with SO-239 connectors for easy hookup.

Kit HA-201A, 2 lbs. 34.95
HDP-3622, 3-ft. RG8U jumper with PL259 conn.
1 lb. 4.95

HA-201A SPECIFICATIONS: Power Output (at 13.6 VDC input): 8 W @ 1 W in; 10 W @ 1.5 W in. **Input/Output Impedance:** 50Ω. **Power Requirement:** 12-16 VDC, 2.2 A max. **Size:** 2¾" H x 5⅝" W x 5⅛" L.

100

Action-packed listening

Built-in antennas for each band plus external antenna provision

Checks priority channel every 4 seconds

VHF/UHF Monitor puts you right in the action on three high-traffic bands

$79⁹⁵
- Built-in antenna for each band
- Automatically scans channels
- AC and 12 VDC power supplies

Monitor fire calls, police, ambulance, Amateur 2-meter FM, marine emergency vehicles, gov't weather stations, more. Automatically scans each channel, stopping on any signal, then resumes scan after broadcast. Priority feature — checks priority channel every 4 seconds. 4-pole crystal filter (for better selectivity order optional 8-pole filter below); channel lockout buttons; extra-large lighted channel indicators. Telescoping antennas. Built-in speaker, volume and squelch controls. Order crystal certificates below.

Kit GR-1132, Shpg. wt. 9 lbs. 79.95

Crystal Certificate. You send one to crystal mfr. for each specific frequency. Crystal returned postpaid.
GRA-1100-1 . . . . each 4.95

Outdoor Scanner Antenna (Antenna Specialists MONR 31). Tri-band base- and center-loaded base station ground plane antenna. Mast to 1½″ dia. SO-239 receptacle.
GRA-1132-1, 2 lbs. 29.95
GRA-1131-1, Mobile Mounting Bracket, 1 lb. . . . 4.95
GRA-1100-2, 8-pole crystal filter, 1 lb. 11.95

4-Band Shortwave Receiver — just right for the beginning kit builder — your introduction to the fascinating world of shortwave listening

$89⁹⁵
- Complete coverage from 550 kHz to 30 MHz in four bands
- Built-in AM rod antenna plus connection for external short wave antenna
- Built-in speaker plus front panel jack for external speaker or headphone

If you're looking for a great first-time radio kit — or simply a great low-priced shortwave receiver — the SW-717 is for you. It's an ideal introduction to the fun and fascination of electronic kit construction — and the assembled radio will bring you many years of listening enjoyment.

Tunes foreign broadcasts from all over the globe — amateur and CB radio bands — local and marine weather reports — ships at sea — plus standard AM — it's a world of exciting listening at your fingertips!

Features wide slide-rule tuning dial with logging scale; bandspread tuning for easy separation of crowded stations; variable BFO for code reception; built-in speaker; front panel jack for external speaker or headphone; switchable automatic noise limiting; signal-strength tuning meter; built-in AM rod antenna plus connection for SWL antenna.

Solid-state circuitry is used throughout the SW-717. Most of the components are mounted on a single printed circuit board, both for ease of assembly and for reliability of performance. The built-in power supply is transformer-operated from either 120 VAC or 240 VAC, and uses four silicon diodes in a full-wave bridge circuit. Alignment of the receiver can be performed without instruments; however the Heathkit manual for the SW-717 includes instructions for instrument-alignment should you prefer.

The SW-717 is an ideal kit for the beginning electronics hobbyist, and it's especially recommended for use with our ER-3701 Amateur Radio Novice License program (see page 18). The manual includes instructions for operation, and a reception guide listing bands, frequencies, zones and times of best shortwave reception. Complete, easy-to-follow instructions and careful engineering make the SW-717 an attractive, responsive receiver. You'll be proud to tell your friends, "I built it myself."
Kit SW-717, Shpg. wt. 10 lbs. 89.95

Long-wire SWL Antenna. Really helps you pull in distant stations. 75′ long wire with 30′ lead-in, all insulators and hardware for easy setup. A must for the serious listener.
GRA-72, Shpg. wt. 2 lbs. 5.95

Superex Headphones. Ideal for use with the SW-717 and other shortwave receivers. Feature dual coils for excellent sensitivity, wide headband for comfortable listening. 600 ohms impedance.
GD-396, Fully assembled, Shpg. wt. 2 lbs. 6.95

SW-717 SPECIFICATIONS: Frequency coverage: 550 kHz - 1500 kHz, 1.5 – 4 MHz, 4 – 10 MHz, 10 – 30 MHz. **Meter:** Indicates relative signal strength. **Headphone Jack:** Accepts low impedance headphone or external speaker. **Loudspeaker:** Built-in. **Power Requirement:** 120/240 VAC, 60/50 Hz, 8 W. **Dimensions:** 5⅓″ H x 14½″ W x 8″ D.

A great addition to your SWL library
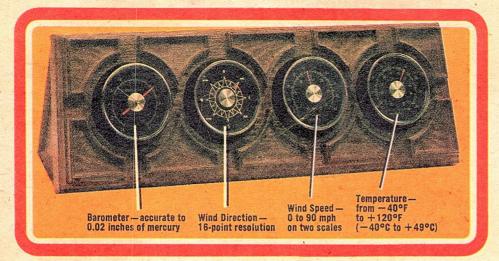
99 Ways to Improve Your Shortwave Listening. Details inexpensive and no-cost ways to get more pleasure from your hobby. Includes: antennas and installation, receiver improvements, listening techniques, troubleshooting tips and more. For the hobbyist, but valuable for the technician, too.
EDP-155 . . . . 4.50
Book-ordering information on page 53.

Sanyo 9-band Portable Shortwave Receiver with SW double conversion

The SWP-3010 (San . . . eives high marks from the . . . n department. It feat . . . ing 525-1615 kH: . . . 1.6-2.3 MHz, 2.3- . . . 2-10 MHz, 11.7-20 MHz . . . te bass, treble, BFO and RF g . . . xternal antenna terminals. AC, 1 . . . ″ cells (not included).
SWP-3010, Fully assembled, 12 lbs. 279.95

$279⁹⁵
Manufacturer's list price $329.95
Heath price $279.95

Telescoping MB, FM antennas
5″ Unicone speaker
Revolving MW/LW bar antenna
Fine tuning control

SORRY — NOT AVAILABLE

101

Heathkit deluxe electronic weather instruments

Barometer—accurate to 0.02 inches of mercury

Wind Direction—16-point resolution

Wind Speed—0 to 90 mph on two scales

Temperature—from −40°F to +120°F (−40°C to +49°C)

Handsome wood-grain plastic cabinet mounts horizontally or vertically on wall, or use on desk

Remote transmitter clamps onto any 1″ to 1½″ TV antenna mast

Get instant, accurate weather readings anywhere!
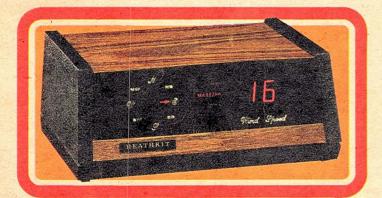
Easy-to-read precision Five-Function Weather Station

Wherever instant, electronically accurate weather information is needed, the Heathkit ID-1290 Weather Station keeps track of indoor and outdoor temperatures, barometric pressure, wind speed and direction. The thermometer is calibrated in two-degree increments from −40°F to +120°F (−40°C to +49°C), with a switch to select indoor or outdoor readings. The barometer helps you keep abreast of changing conditions by indicating movements as small as 0.02 inch of mercury. You can read wind speed from 0 to 90 mph in two ranges, with eight wind direction lights providing 16-point resolution for precision readings. With its walnut-grained plastic cabinet, the ID-1290 can be used as a handsome desk set, or can be hung horizontally or vertically. The remote transmitter assembly (windcups, weather vane and outdoor temperature sensor) is included

with the ID-1290. It clamps onto any 1″ or 1½″ diameter TV antenna mast, and is connected to the cabinet with optional eight-wire cable (below).

Kit ID-1290, Shpg. wt. 8 lbs. **119.95**
8-Wire cable for remote transmitters. **IDA-1290-1,** 50 ft. cable, 2 lbs. **7.95**
IDA-1290-2, 100 ft. cable, 4 lbs. . . **13.95**   **IDA-1290-3,** 150 ft. cable, 6 lbs. . . **18.95**

ID-1290 SPECIFICATIONS: Wind speed: 0-30 mph, ±2 mph; 0-90 mph, ± 5 mph. **Wind direction:** 16-point readout over 360°. **Temperature:** Typ. indoor: 0°F to +120°F, ±2°F (−18°C to +49°C, ±1°C). Typ. outdoor: −40°F to +120°F, ±2°F (−40°C to +49°C, ±1°C). **Barometric pressure:** 29 to 31 inches of mercury ±0.02 inch, accurate to 10,000 feet. **Power requirement:** 110 to 130 VAC, 50/60 Hz, 3.5 watts. **Dimensions:** Wall mount: 7″ H x 20½″ W x 2″ D. Desk: 7″ H x 20½″ W x 6¾″ D.

High-accuracy digital Wind Speed and Direction Indicator

Outstanding accuracy and an easy-to-read digital display make this kit a must for pilots, boaters — anyone whose activities are affected by the wind. Choose the two readout modes you want from the three available (miles per hour, kilometers per hour or knots). Switches select the mode and front panel lights show which mode is in use. The eight principal compass points are marked by lights, providing 16-point resolution. This easy to build kit will be a welcome addition to your home. Includes remote transmitter as above. Requires eight-wire cable. Order from above.

Kit ID-1590, Shpg. wt. 7 lbs. **69.95**

ID-1590 SPECIFICATIONS: Wind speed: 0 to 99 in mph, km/h or knots (choice of two). **Response threshold:** 3 mph. **Accuracy:** ±1 digit or ±10%, whichever is greater. **Direction response threshold:** approx. 2 mph. **Operating temperature:** Receiver: 0°F to +150°F (−18°C to +65°C). Transmitter: −40°F to +120°F (−40°C to +49°C). **Power requirement:** 120 VAC, 50/60 Hz, 6.5 watts. **Dimensions:** 2½″ H x 7″ W x 5″ D.

Easy-to-build digital Indoor/Outdoor Thermometer

Monitor indoor/outdoor (or any two) temperatures with a big, bright ½″ high digital readout. The readout includes plus and minus signs, as well as indoor and outdoor indicator lights. Select Fahrenheit or Celsius temperatures, continuous readings of one temperature or alternate readings of both. The 10′ indoor and 75′ outdoor cables (included) let you place the temperature sensors almost anywhere (home freezer, hot house, basement, swimming pool and a variety of custom applications). Black Cycolac® plastic case with teak-grain vinyl inserts. A practical, easy-to-build kit that gives value year around.

Kit ID-1390, Shpg. wt. 4 lbs. **69.95**

ID-1390 SPECIFICATIONS: Temperature range: −40°F to +120°F (−40°C to +50°C). **Accuracy:** ±2°F from −30°F to +1°F from +20°F to +120°F, ±2°C from −30°C to −15°C, ±1°C from −15°C to +50°C. **Display:** 2½-digit planar gas discharge with + and − signs. **Power requirement:** 110 to 130 VAC, 60 Hz, 4 to 6 watts approx. **Dimensions:** 2½″ H x 7″ W x 5″ D.

Get instant weather reports with this computerized weather station

THE Electronic Weatherman

You get indoor and outdoor temperatures, wind speed and direction, barometric pressure...even the time and date...all right at your fingertips.

Heathkit Digital Weather Computer gives you instant, accurate past, present and future weather data. For boaters, pilots, campers, for anyone going outdoors, the weather station can tell you what to expect. Microprocessor-based electronics put everything at your fingertips.

Easy to use. A compact transmitter mounts on your TV antenna mast and relays weather data to the computerized console indoors. The transmitter unit, with windcups and weathervane, features special infra-red sensing devices that are far more sensitive and reliable than old-fashioned mechanical switches or wipers.

Beautiful styling. The Weather Computer has a handsome solid walnut cabinet. You get large, bright digital readouts for temperatures in degrees Fahrenheit or degrees Celsius, for wind speed and direction in miles and kilometers per hour or in knots, for barometric pressure in inches of mercury or millibars, and for time and date. It even calculates the wind chill factor.

Memory stores data. The Weather Computer stores the high and low temperatures, the minimum and maximum barometric pressures, peak and average winds, plus the time and date that each occurred. It calculates the rate at which the barometric pressure changes so you are alerted to storm fronts. You can even connect your own external battery to maintain the memory in case of power failure.

Order the Heathkit Weather Computer today, kit or assembled. And you'll have your own reliable, weather reports at the press of a button.

Kit ID-4001, Shpg. wt. 15 lbs. **369.95**

Factory Assembled and Tested Version of above.
IDW-4001. Includes 100' cable. Shpg. wt. 22 lbs. **495.00**

ID-4001 SPECIFICATIONS: DIGITAL CLOCK/4-YEAR CALENDAR. Time Accuracy: Determined by accuracy of AC line. No accumulative error. **WIND VECTOR: Accuracy:** ±5% or better. **Direction Display: Accuracy:** ±11.26% degrees. **THERMOMETER: Temperature Range:** −40° to 70° C; −40° to 158° F. **Accuracy:** ±1° on Celsius readings; ±2° on Fahrenheit readings. **BAROMETER: Pressure Range:** 28.00 to 32.00 in Hg (inches of mercury). 981.9 to 1050 millibars. **Accuracy:** ±0.075 in Hg plus ±0.01 in Hg/°C. **Operating Temperatures:** Outdoor assemblies, −40° C to +70° C (−40° F to 158° F). Unit, 10° to 35° C (59° to 95° F). **Power Requirement:** 120/240 VAC. Provision for external battery connection for memory backup during power failures. **Dimensions:** 7¼″ H x 16″ W x 6″ D.

8-Wire cable for ID-4001 kit version

IDA-1290-1, 50 ft. cable, 2 lbs.   **7.95**
IDA-1290-2, 100 ft. cable, 4 lbs.   **13.95**
IDA-1290-3, 150 ft. cable, 6 lbs.   **18.95**
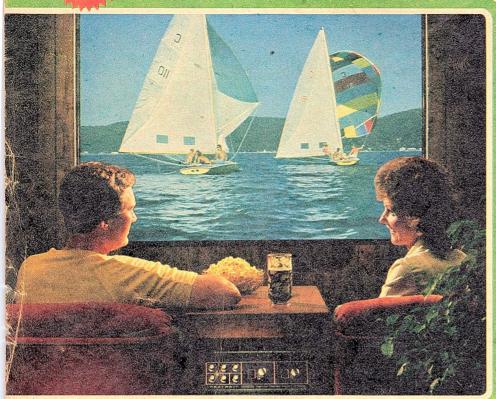
The ID-4001 can be interfaced to the H8 Computer. For details write Heath Tech Correspondence Department.

The ID-4001 comes with the remote transmitter assembly shown here. The transmitter assembly attaches easily to your TV antenna mast. Cable for kit ID-4001 must be ordered separately in the length you require. IDW-4001 comes with 100' cable included.

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